

## SEQUENCE LISTING

<110> Milich, David R.  
 Billaud, Jean-Noel

<120> Hepatitis B Virus Core Proteins as Vaccine Platforms and Methods  
 of Use Thereof

<130> VACCINE-08820

<160> 256

<170> PatentIn version 3.2

<210> 1

<211> 188

<212> PRT

<213> Woodchuck hepatitis virus

<400> 1

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ser Ser Tyr Gln Leu Leu  
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Asn Phe Leu Pro Leu Asp Phe Phe Pro Asp Leu Asn Ala Leu Val Asp  
 20 25 30

Thr Ala Thr Ala Leu Tyr Glu Glu Glu Leu Thr Gly Arg Glu His Cys  
 35 40 45

Ser Pro His His Thr Ala Ile Arg Gln Ala Leu Val Cys Trp Asp Glu  
 50 55 60

Leu Thr Lys Leu Ile Ala Trp Met Ser Ser Asn Ile Thr Ser Glu Gln  
 65 70 75 80

Val Arg Thr Ile Ile Val Asn His Val Asn Asp Thr Trp Gly Leu Lys  
 85 90 95

Val Arg Gln Ser Leu Trp Phe His Leu Ser Cys Leu Thr Phe Gly Gln  
 100 105 110

His Thr Val Gln Glu Phe Leu Val Ser Phe Gly Val Trp Ile Arg Thr  
 115 120 125

Pro Ala Pro Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
 130 135 140

Glu His Thr Val Ile Arg Arg Arg Gly Gly Ala Arg Ala Ser Arg Ser  
 145 150 155 160

Pro Arg Arg Arg Thr Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro  
 165 170 175

Arg Arg Arg Arg Ser Gln Ser Pro Ser Ala Asn Cys  
 180 185

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 <213> Woodchuck hepatitis virus  
 <400> 2

Arg Arg Arg Gly Gly Ala Arg Ala Ser Arg Ser Pro Arg Arg Arg Thr  
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Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg Arg Ser  
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Gln Ser Pro Ser Ala Asn Cys  
 35

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Arg Arg Arg Cys  
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<210> 4  
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Arg Arg Arg Arg Cys  
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<210> 5  
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Lys Lys Lys Cys  
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Ala Ala Ala Cys  
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<210> 7  
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<400> 7

Ala Ala Gly Gly Ala Arg Ala Ser Arg Ser Pro Ser Gln Ser Pro Ser  
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Gln Ser Pro Ser Ala Asn Cys  
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<210> 8  
<211> 21  
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Ala Ala Gly Gly Ala Arg Ala Ser Arg Ser Gln Ser Pro Ser Gln Ser  
1 5 10 15

Pro Ser Ala Asn Cys  
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<210> 9  
<211> 20  
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<213> Woodchuck hepatitis virus  
  
<400> 9

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Ser Ala Asn Cys  
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<212> PRT  
<213> Woodchuck hepatitis virus

<400> 10

Ala Ala Gly Gly Ala Arg Ala Ser Arg Ser Gln Ser Ser Gln Ser Ser  
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Ala Asn Cys

<210> 11  
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<213> Woodchuck hepatitis virus

<400> 11

Arg Arg Gly Gly Ala Arg Ala Ser Gln Ser Ala Asn Cys  
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<210> 12  
<211> 13  
<212> PRT  
<213> Woodchuck hepatitis virus

<400> 12

Ala Arg Gly Gly Ala Arg Ala Ser Gln Ser Ala Asn Cys  
1 5 10

<210> 13  
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<213> Woodchuck hepatitis virus

<400> 13

Arg Ala Gly Gly Ala Arg Ala Ser Gln Ser Ala Asn Cys  
1 5 10

<210> 14  
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<212> PRT  
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<400> 14

Ala Ala Gly Gly Ala Arg Ala Ser Gln Ser Ala Asn Cys  
1 5 10

<210> 15  
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 <212> PRT  
 <213> Woodchuck hepatitis virus

<400> 15

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Arg Glu Ser  
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Gln Cys

<210> 16  
 <211> 18  
 <212> PRT  
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<400> 16

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Pro Ser Ala  
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Asn Cys

<210> 17  
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 <213> Woodchuck hepatitis virus

<400> 17

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Ser Ala Asn  
 1 5 10 15

Cys

<210> 18  
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 <212> PRT  
 <213> Woodchuck hepatitis virus

<400> 18

Ala Ala Gly Arg Ser Gln Ser Pro Ser Gln Ser Ser Ala Asn Cys  
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<210> 19  
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 <212> PRT  
 <213> Woodchuck hepatitis virus

<400> 19

Ala Ala Gly Arg Ser Pro Ser Gln Ser Ser Gln Ser Ser Ala Asn Cys  
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<210> 20  
 <211> 14  
 <212> PRT  
 <213> Woodchuck hepatitis virus

<400> 20

Ala Ala Gly Arg Ser Gln Ser Ser Gln Ser Ser Ala Asn Cys  
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<210> 21  
 <211> 187  
 <212> PRT  
 <213> Ground squirrel hepatitis virus

<400> 21

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ser Ser Tyr Gln Leu Leu  
 1 5 10 15

Asn Phe Leu Pro Leu Asp Phe Phe Pro Asp Leu Asn Ala Leu Val Asp  
 20 25 30

Thr Ala Ala Ala Leu Tyr Glu Glu Glu Leu Thr Gly Arg Glu His Cys  
 35 40 45

Ser Pro His His Thr Ala Ile Arg Gln Ala Leu Val Cys Trp Glu Glu  
 50 55 60

Leu Thr Arg Leu Ile Thr Trp Met Ser Glu Asn Thr Thr Glu Glu Val  
 65 70 75 80

Arg Arg Ile Ile Val Asp His Val Asn Asn Thr Trp Gly Leu Lys Val  
 85 90 95

Arg Gln Thr Leu Trp Phe His Leu Ser Cys Leu Thr Phe Gly Gln His  
 100 105 110

Thr Val Gln Glu Phe Leu Val Ser Phe Gly Val Trp Ile Arg Thr Pro  
 115 120 125

Ala Pro Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro Glu  
 130 135 140

His Thr Val Ile Arg Arg Arg Gly Gly Ser Arg Ala Ala Arg Ser Pro  
 145 150 155 160

Arg Arg Arg Thr Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg  
 165 170 175

Arg Arg Arg Ser Gln Ser Pro Ala Ser Asn Cys  
 180 185

<210> 22  
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<400> 22

Arg Arg Arg Gly Gly Ser Arg Ala Ala Arg Ser Pro Arg Arg Arg Thr  
 1 5 10 15

Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg Arg Ser  
 20 25 30

Gln Ser Pro Ala Ser Asn Cys  
 35

<210> 23  
 <211> 23  
 <212> PRT  
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<400> 23

Ala Ala Gly Gly Ser Arg Ala Ala Arg Ser Pro Ser Gln Ser Pro Ser  
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Gln Ser Pro Ala Ser Asn Cys  
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<210> 24  
 <211> 21  
 <212> PRT  
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<400> 24

Ala Ala Gly Gly Ser Arg Ala Ala Arg Ser Gln Ser Pro Ser Gln Ser  
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Pro Ala Ser Asn Cys  
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<210> 25

<211> 20

<212> PRT

<213> Ground squirrel hepatitis virus

<400> 25

Ala Ala Gly Gly Ser Arg Ala Ala Arg Ser Gln Ser Ser Gln Ser Pro  
1 5 10 15

Ala Ser Asn Cys  
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<210> 26

<211> 19

<212> PRT

<213> Ground squirrel hepatitis virus

<400> 26

Ala Ala Gly Gly Ser Arg Ala Ala Arg Ser Gln Ser Ser Gln Ser Ala  
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Ser Asn Cys

<210> 27

<211> 14

<212> PRT

<213> Ground squirrel hepatitis virus

<400> 27

Arg Arg Gly Gly Ser Arg Ala Ala Ser Gln Ala Ser Asn Cys  
1 5 10

<210> 28

<211> 14

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<213> Ground squirrel hepatitis virus

<400> 28

Ala Arg Gly Gly Ser Arg Ala Ala Ser Gln Ala Ser Asn Cys  
1 5 10



<210> 29  
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<213> Ground squirrel hepatitis virus

<400> 29

Arg Ala Gly Gly Ser Arg Ala Ala Ser Gln Ala Ser Asn Cys  
1 5 10

<210> 30  
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<212> PRT  
<213> Ground squirrel hepatitis virus

<400> 30

Ala Ala Gly Gly Ser Arg Ala Ala Ser Gln Ala Ser Asn Cys  
1 5 10

<210> 31  
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<212> PRT  
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<400> 31

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Arg Glu Ser  
1 5 10 15

Gln Cys

<210> 32  
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<212> PRT  
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<400> 32

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Pro Ala Ser  
1 5 10 15

Asn Cys

<210> 33  
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<212> PRT  
<213> Ground squirrel hepatitis virus

&lt;400&gt; 33

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Ala Ser Asn  
 1 5 10 15

Cys

&lt;210&gt; 34

&lt;211&gt; 15

&lt;212&gt; PRT

&lt;213&gt; Ground squirrel hepatitis virus

&lt;400&gt; 34

Ala Ala Gly Arg Ser Gln Ser Pro Ser Gln Ser Ala Ser Asn Cys  
 1 5 10 15

&lt;210&gt; 35

&lt;211&gt; 16

&lt;212&gt; PRT

&lt;213&gt; Ground squirrel hepatitis virus

&lt;400&gt; 35

Ala Ala Gly Arg Ser Pro Ser Gln Ser Ser Gln Ser Ala Ser Asn Cys  
 1 5 10 15

&lt;210&gt; 36

&lt;211&gt; 14

&lt;212&gt; PRT

&lt;213&gt; Ground squirrel hepatitis virus

&lt;400&gt; 36

Ala Ala Gly Arg Ser Gln Ser Ser Gln Ser Ala Ser Asn Cys  
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&lt;210&gt; 37

&lt;211&gt; 567

&lt;212&gt; DNA

&lt;213&gt; Woodchuck hepatitis virus

&lt;400&gt; 37

atggacatag atccctataa agaatttggt tcatcttatac agttgttgaa ttttcttcct 60  
 ttggacttct ttctgacct taatgctttg gtggacactg ctactgcctt gtatgaagaa 120  
 gagctaacag gtagggaaca ttgctctccg caccatacag ctattagaca agcttttagta 180  
 tgctgggatg aattaactaa attgatagct tggatgagct ctaacataac ttctgaacaa 240  
 gtaagaacaa tcattgtaaa tcatgtcaat gatacctggg gacttaaggt gagacaaagt 300  
 ttatggtttc atttgtcatg tctcactttc ggacaacata cagttcaaga atttttagta 360  
 agttttggag tatggatcag gactccagct ccatatagac ctctaatgc acccattctc 420

tcgactcttc cggaacatac agtcattagg agaagaggag gtgcaagagc ttctaggtcc 480  
 cccagaagac gcactccctc tcctcgagg agaagatctc aatcaccgcg tcgcagacgc 540  
 tctcaatctc catctgcca ctgctga 567

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 <212> PRT  
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<400> 38

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ser Ser Tyr Gln Leu Leu  
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Asn Phe Leu Pro Leu Asp Phe Phe Pro Asp Leu Asn Ala Leu Val Asp  
 20 25 30

Thr Ala Thr Ala Leu Tyr Glu Glu Glu Leu Thr Gly Arg Glu His Cys  
 35 40 45

Ser Pro His His Thr Ala Ile Arg Gln Ala Leu Val Cys Trp Asp Glu  
 50 55 60

Leu Thr Lys Leu Ile Ala Trp Met Ser Ser Asn Ile Thr Ser Glu Gln  
 65 70 75 80

Val Arg Thr Ile Ile Val Asn His Val Asn Asp Thr Trp Gly Leu Lys  
 85 90 95

Val Arg Gln Ser Leu Trp Phe His Leu Ser Cys Leu Thr Phe Gly Gln  
 100 105 110

His Thr Val Gln Glu Phe Leu Val Ser Phe Gly Val Trp Ile Arg Thr  
 115 120 125

Pro Ala Pro Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
 130 135 140

Glu His Thr Val Ile  
 145

<210> 39  
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 <212> DNA  
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 gaattaacag gtagggagca ttgttctcct catcactg ctattagaca ggccttagtg 180  
 tgttgggaag aattaactag attaattaca tggatgagtg aaaatacaac agaagaagtt 240  
 agaagaatta ttgttgatca tgtcaataat acttggggac ttaaagtaag acagacttta 300  
 tggtttcatt tatcatgtct tacttttggg caacacacag ttcaagaatt tttggttagt 360  
 tttggagtat ggattagaac tccagctcct tatagaccac ctaatgcacc cattttatca 420  
 actcttccgg aacatacagt cattaggaga agaggaggtt caagagctgc taggtccccc 480  
 cgaagacgca ctccctctcc tcgcaggaga aggtctcaat caccgcgtcg cagacgctct 540  
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<210> 40  
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 <212> PRT  
 <213> Ground squirrel hepatitis virus

<400> 40

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ser Ser Tyr Gln Leu Leu  
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Asn Phe Leu Pro Leu Asp Phe Phe Pro Asp Leu Asn Ala Leu Val Asp  
 20 25 30

Thr Ala Ala Ala Leu Tyr Glu Glu Glu Leu Thr Gly Arg Glu His Cys  
 35 40 45

Ser Pro His His Thr Ala Ile Arg Gln Ala Leu Val Cys Trp Glu Glu  
 50 55 60

Leu Thr Arg Leu Ile Thr Trp Met Ser Glu Asn Thr Thr Glu Glu Val  
 65 70 75 80

Arg Arg Ile Ile Val Asp His Val Asn Asn Thr Trp Gly Leu Lys Val  
 85 90 95

Arg Gln Thr Leu Trp Phe His Leu Ser Cys Leu Thr Phe Gly Gln His  
 100 105 110

Thr Val Gln Glu Phe Leu Val Ser Phe Gly Val Trp Ile Arg Thr Pro  
 115 120 125

Ala Pro Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro Glu  
 130 135 140

His Thr Val Ile  
 145

<210> 41  
 <211> 183  
 <212> PRT  
 <213> Human hepatitis B virus

<400> 41

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu  
 1 5 10 15

Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp  
 20 25 30

Thr Ala Ser Ala Leu Tyr Arg Glu Ala Leu Glu Ser Pro Glu His Cys  
 35 40 45

Ser Pro His His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu  
 50 55 60

Leu Met Thr Leu Ala Thr Trp Val Gly Val Asn Leu Glu Asp Pro Ala  
 65 70 75 80

Ser Arg Asp Leu Val Val Ser Tyr Val Asn Thr Asn Met Gly Leu Lys  
 85 90 95

Phe Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg  
 100 105 110

Glu Thr Val Ile Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr  
 115 120 125

Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
 130 135 140

Glu Thr Thr Val Val Arg Arg Arg Gly Arg Ser Pro Arg Arg Thr  
 145 150 155 160

-14-

<210> 46  
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<213> Human hepatitis B virus

<400> 46

Ala Ala Gly Arg Ser Gln Ser Ser Gln Ser Glu Ser Gln Cys  
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<210> 47  
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<212> PRT  
<213> Human hepatitis B virus

<400> 47

Arg Arg Gly Ser Gln Ser Arg Glu Ser Gln Cys  
1 5 10

<210> 48  
<211> 11  
<212> PRT  
<213> Human hepatitis B virus

<400> 48

Ala Arg Gly Ser Gln Ser Arg Glu Ser Gln Cys  
1 5 10

<210> 49  
<211> 11  
<212> PRT  
<213> Human hepatitis B virus

<400> 49

Arg Ala Gly Ser Gln Ser Arg Glu Ser Gln Cys  
1 5 10

<210> 50  
<211> 11  
<212> PRT  
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<400> 50

Ala Ala Gly Ser Gln Ser Arg Glu Ser Gln Cys  
1 5 10

<210> 51  
 <211> 18  
 <212> PRT  
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<400> 51

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Pro Ser Ala  
 1 5 10 15

Asn Cys

<210> 52  
 <211> 18  
 <212> PRT  
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<400> 52

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Arg Glu Ser  
 1 5 10 15

Gln Cys

<210> 53  
 <211> 17  
 <212> PRT  
 <213> Human hepatitis B virus

<400> 53

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Glu Ser Gln  
 1 5 10 15

Cys

<210> 54  
 <211> 15  
 <212> PRT  
 <213> Human hepatitis B virus

<400> 54

Ala Ala Gly Arg Ser Gln Ser Pro Ser Gln Ser Glu Ser Gln Cys  
 1 5 10 15



<210> 55  
 <211> 16  
 <212> PRT  
 <213> Human hepatitis B virus

<400> 55

Ala Ala Gly Arg Ser Pro Ser Gln Ser Ser Gln Ser Glu Ser Gln Cys  
 1 5 10 15

<210> 56  
 <211> 14  
 <212> PRT  
 <213> Human hepatitis B virus

<400> 56

Ala Ala Gly Arg Ser Gln Ser Ser Gln Ser Glu Ser Gln Cys  
 1 5 10

<210> 57  
 <211> 552  
 <212> DNA  
 <213> Human hepatitis B virus

<400> 57  
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 gccttagagt ctcttgagca ttgttcacct caccatactg cactcaggca agcaattctt 180  
 tgctgggggg aactaatgac tctagctacc tgggtgggtg ttaatttgga agatccagca 240  
 tccagagacc tagtagtcag ttatgtcaac actaatatgg gcctaaagt caggcaactc 300  
 ttgtggtttc acatttcttg tctcactttt ggaagagaaa ccgttataga gtatttggtg 360  
 tctttcggag tgtggattcg cactcctoca gcttatagac caccaaatgc ccctatccta 420  
 tcaacacttc cggaaactac tgttgttaga cgacgaggca ggtcccctag aagaagaact 480  
 cctcgcctc gcagacgaag gtctcaatcg ccgcgtcgca gaagatctca atctcgggaa 540  
 tctcaatggt ga 552

<210> 58  
 <211> 149  
 <212> PRT  
 <213> Human hepatitis B virus

<400> 58

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu  
 1 5 10 15

Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp  
 20 25 30

Thr Ala Ser Ala Leu Tyr Arg Glu Ala Leu Glu Ser Pro Glu His Cys  
 35 40 45

Ser Pro His His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu  
 50 55 60

Leu Met Thr Leu Ala Thr Trp Val Gly Val Asn Leu Glu Asp Pro Ala  
 65 70 75 80

Ser Arg Asp Leu Val Val Ser Tyr Val Asn Thr Asn Met Gly Leu Lys  
 85 90 95

Phe Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg  
 100 105 110

Glu Thr Val Ile Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr  
 115 120 125

Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
 130 135 140

Glu Thr Thr Val Val  
 145

<210> 59  
 <211> 12  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic

<400> 59

Val Ser Phe Gly Val Trp Ile Arg Thr Pro Ala Pro  
 1 5 10

<210> 60  
 <211> 12  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic

<400> 60

Val Ser Phe Gly Val Trp Ile Arg Thr Pro Pro Ala  
 1 5 10

<210> 61  
<211> 21  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Synthetic

<400> 61

Val Cys Trp Asp Glu Leu Thr Lys Leu Ile Ala Trp Met Ser Ser Asn  
1 5 10 15

Ile Thr Ser Glu Gln  
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<210> 62  
<211> 21  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Synthetic

<400> 62

Leu Cys Trp Gly Glu Leu Met Thr Leu Ala Thr Trp Val Gly Gly Asn  
1 5 10 15

Leu Glu Asp Pro Ile  
20

<210> 63  
<211> 19  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Synthetic

<400> 63  
ggaaattcctt ctcctcgag

19

<210> 64  
<211> 24  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Synthetic

&lt;400&gt; 64

Met Ser Leu Leu Thr Glu Val Glu Thr Pro Ile Arg Asn Glu Trp Gly  
 1 5 10 15

Cys Arg Cys Asn Asp Ser Ser Asp  
 20

&lt;210&gt; 65

&lt;211&gt; 18

&lt;212&gt; PRT

&lt;213&gt; Plasmodium vivax

&lt;400&gt; 65

Ala Asn Gly Ala Gly Asn Gln Pro Gly Ala Asn Gly Ala Gly Asp Gln  
 1 5 10 15

Pro Gly

&lt;210&gt; 66

&lt;211&gt; 18

&lt;212&gt; PRT

&lt;213&gt; Plasmodium vivax

&lt;400&gt; 66

Ala Asn Gly Ala Asp Asn Gln Pro Gly Ala Asn Gly Ala Asp Asp Gln  
 1 5 10 15

Pro Gly

&lt;210&gt; 67

&lt;211&gt; 22

&lt;212&gt; PRT

&lt;213&gt; Plasmodium vivax

&lt;400&gt; 67

Ala Pro Gly Ala Asn Gln Glu Gly Gly Ala Ala Ala Pro Gly Ala Asn  
 1 5 10 15

Gln Glu Gly Gly Ala Ala  
 20

&lt;210&gt; 68

&lt;211&gt; 12

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Synthetic

&lt;400&gt; 68

Asn Ala Asn Pro Asn Ala Asn Pro Asn Ala Asn Pro  
 1 5 10

&lt;210&gt; 69

&lt;211&gt; 260

&lt;212&gt; PRT

&lt;213&gt; Mus musculus

&lt;400&gt; 69

Met Ile Glu Thr Tyr Ser Gln Pro Ser Pro Arg Ser Val Ala Thr Gly  
 1 5 10 15

Leu Pro Ala Ser Met Lys Ile Phe Met Tyr Leu Leu Thr Val Phe Leu  
 20 25 30

Ile Thr Gln Met Ile Gly Ser Val Leu Phe Ala Val Tyr Leu His Arg  
 35 40 45

Arg Leu Asp Lys Val Glu Glu Glu Val Asn Leu His Glu Asp Phe Val  
 50 55 60

Phe Ile Lys Lys Leu Lys Arg Cys Asn Lys Gly Glu Gly Ser Leu Ser  
 65 70 75 80

Leu Leu Asn Cys Glu Glu Met Arg Arg Gln Phe Glu Asp Leu Val Lys  
 85 90 95

Asp Ile Thr Leu Asn Lys Glu Glu Lys Lys Glu Asn Ser Phe Glu Met  
 100 105 110

Gln Arg Gly Asp Glu Asp Pro Gln Ile Ala Ala His Val Val Ser Glu  
 115 120 125

Ala Asn Ser Asn Ala Ala Ser Val Leu Gln Trp Ala Lys Lys Gly Tyr  
 130 135 140

Tyr Thr Met Lys Ser Asn Leu Val Met Leu Glu Asn Gly Lys Gln Leu  
 145 150 155 160

Thr Val Lys Arg Glu Gly Leu Tyr Tyr Val Tyr Thr Gln Val Thr Phe  
 165 170 175

Cys Ser Asn Arg Glu Pro Ser Ser Gln Arg Pro Phe Ile Val Gly Leu  
                   180                                  185                                  190

Trp Leu Lys Pro Ser Ser Gly Ser Glu Arg Ile Leu Leu Lys Ala Ala  
                   195                                  200                                  205

Asn Thr His Ser Ser Ser Gln Leu Cys Glu Gln Gln Ser Val His Leu  
                   210                                  215                                  220

Gly Gly Val Phe Glu Leu Gln Ala Gly Ala Ser Val Phe Val Asn Val  
                   225                                  230                                  235                                  240

Thr Glu Ala Ser Gln Val Ile His Arg Val Gly Phe Ser Ser Phe Gly  
                                   245                                  250                                  255

Leu Leu Lys Leu  
                   260

<210> 70  
 <211> 25  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic

<400> 70

Gly Glu Ile Lys Asn Cys Ser Phe Asn Ile Ser Thr Ser Ile Arg Gly  
   1                  5                                  10                                  15

Lys Val Gln Lys Glu Tyr Ala Phe Phe  
                   20                                  25

<210> 71  
 <211> 26  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic

<400> 71

Leu Thr Ser Cys Asn Thr Ser Val Ile Thr Gln Ala Cys Pro Lys Val  
   1                  5                                  10                                  15

Ser Phe Glu Pro Ile Pro Ile His Tyr Cys  
                   20                                  25

<210> 72  
<211> 25  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Synthetic

<400> 72

Pro Lys Val Ser Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala  
1 5 10 15

Gly Phe Ala Ile Leu Lys Cys Asn Asn  
20 25

<210> 73  
<211> 22  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Synthetic

<400> 73

Thr His Gly Ile Arg Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly  
1 5 10 15

Ser Leu Ala Glu Glu Glu  
20

<210> 74  
<211> 18  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Synthetic

<400> 74

Asp Arg Ala Ala Gly Gln Pro Ala Gly Asp Arg Ala Asp Gly Gln Pro  
1 5 10 15

Ala Gly

<210> 75  
<211> 20  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Synthetic

&lt;400&gt; 75

Asn Ala Asn Pro Asn Val Asp Pro Asn Ala Asn Pro Asn Ala Asn Pro  
1 5 10 15

Asn Ala Asn Pro  
20

<210> 76  
<211> 23  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Synthetic

&lt;400&gt; 76

Ser Leu Leu Thr Glu Val Glu Thr Pro Ile Arg Asn Glu Trp Gly Cys  
1 5 10 15

Arg Cys Asn Asp Ser Ser Asp  
20

<210> 77  
<211> 23  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Synthetic

&lt;400&gt; 77

Ser Leu Leu Thr Glu Val Glu Thr Pro Ile Arg Asn Glu Trp Gly Ala  
1 5 10 15

Arg Ala Asn Asp Ser Ser Asp  
20

<210> 78  
<211> 10  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Synthetic

&lt;400&gt; 78

Lys Lys Lys Val Thr Ala Gln Glu Leu Asp  
1 5 10



<210> 79  
 <211> 16  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic

<400> 79

Phe Gly Phe Pro Glu His Leu Leu Val Asp Phe Leu Gln Ser Leu Ser  
 1 5 10 15

<210> 80  
 <211> 22  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic

<400> 80

Phe Tyr Glu Ile Ile Met Asp Ile Glu Gln Asn Asn Val Gln Gly Lys  
 1 5 10 15

Gln Gly Leu Gln Lys Leu  
 20

<210> 81  
 <211> 18  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic

<400> 81

Met Glu Leu Arg Lys Asn Gly Arg Gln Cys Gly Met Ser Glu Lys Glu  
 1 5 10 15

Glu Glu

<210> 82  
 <211> 13  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic

<400> 82

Leu Glu Glu Lys Lys Gly Asn Tyr Val Val Thr Asp His  
 1 5 10

<210> 83  
<211> 12  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Synthetic

<400> 83

Asp Ala Glu Phe Arg His Asp Ser Gly Tyr Glu Val  
1 5 10

<210> 84  
<211> 7  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Synthetic

<400> 84

Phe Arg His Asp Ser Gly Tyr  
1 5

<210> 85  
<211> 11  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Synthetic

<400> 85

Arg Ile Lys Gln Ile Gly Met Pro Gly Gly Lys  
1 5 10

<210> 86  
<211> 10  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Synthetic

<400> 86

Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu  
1 5 10

<210> 87  
<211> 14  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Synthetic

<400> 87

Glu Gln Glu Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp  
1 5 10

<210> 88  
<211> 8  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Synthetic

<400> 88

Asp Thr Gly Phe Leu Ala Ala Leu  
1 5

<210> 89  
<211> 8  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Synthetic

<400> 89

Tyr Cys Phe Thr Pro Ser Pro Val  
1 5

<210> 90  
<211> 8  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Synthetic

<400> 90

Cys Phe Arg Lys His Pro Glu Ala  
1 5

<210> 91  
 <211> 8  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic

<400> 91

Glu Ala Thr Tyr Ser Arg Cys Gly  
 1 5

<210> 92  
 <211> 8  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic

<400> 92

His Leu His Gln Asn Ile Val Asp  
 1 5

<210> 93  
 <211> 26  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic

<400> 93

Arg Tyr Asn Arg Asn Ala Val Pro Asn Leu Arg Gly Asp Leu Gln Val  
 1 5 10 15

Leu Ala Gln Lys Val Ala Arg Thr Leu Phe  
 20 25

<210> 94  
 <211> 11  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic

<400> 94

Thr Ala Val Val His Gln Leu Lys Arg Lys His  
 1 5 10

<210> 95  
 <211> 16  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic

<400> 95

His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg  
 1 5 10 15

<210> 96  
 <211> 23  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic

<400> 96

Gly Glu Thr Tyr Gln Ser Arg Val Thr His Pro His Leu Pro Arg Ala  
 1 5 10 15

Leu Met Arg Ser Thr Thr Lys  
 20

<210> 97  
 <211> 19  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic

<400> 97

Gly Arg Glu Arg Arg Pro Arg Leu Ser Asp Arg Pro Gln Leu Pro Tyr  
 1 5 10 15

Leu Glu Ala

<210> 98  
 <211> 16  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> Synthetic

&lt;400&gt; 98

Asp Pro Pro Pro Pro Asn Pro Asn Asp Pro Pro Pro Pro Asn Pro Asn  
 1 5 10 15

&lt;210&gt; 99

&lt;211&gt; 14

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Synthetic

&lt;400&gt; 99

Glu Glu Lys Lys Lys Val Thr Ala Gln Glu Leu Asp Glu Glu  
 1 5 10

&lt;210&gt; 100

&lt;211&gt; 11

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Synthetic

&lt;400&gt; 100

Glu Glu Phe Arg His Asp Ser Gly Tyr Glu Glu  
 1 5 10

&lt;210&gt; 101

&lt;211&gt; 15

&lt;212&gt; PRT

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Synthetic

&lt;400&gt; 101

Glu Glu Arg Ile Lys Gln Ile Gly Met Pro Gly Gly Lys Glu Glu  
 1 5 10 15

&lt;210&gt; 102

&lt;211&gt; 187

&lt;212&gt; PRT

&lt;213&gt; Arctic ground squirrel hepatitis virus

&lt;400&gt; 102

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ser Ser Tyr Gln Leu Leu  
 1 5 10 15

Asn Phe Leu Pro Leu Asp Phe Phe Pro Glu Leu Asn Ala Leu Val Asp  
 20 25 30

Thr Ala Thr Ala Leu Tyr Glu Glu Glu Leu Thr Gly Arg Glu His Cys  
35 40 45

Ser Pro His His Thr Ala Ile Arg Gln Ala Leu Val Cys Trp Glu Glu  
50 55 60

Leu Thr Arg Leu Ile Ala Trp Met Ser Ala Asn Ile Asn Ser Glu Glu  
65 70 75 80

Val Arg Arg Val Ile Val Ala His Val Asn Asp Thr Trp Gly Leu Lys  
85 90 95

Val Arg Gln Asn Leu Trp Phe His Leu Ser Cys Leu Thr Phe Gly Gln  
100 105 110

His Thr Val Gln Glu Phe Leu Val Ser Phe Gly Val Arg Ile Arg Thr  
115 120 125

Pro Ala Pro Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
130 135 140

Glu His Thr Val Ile Arg Arg Arg Gly Ser Ala Arg Val Val Arg Ser  
145 150 155 160

Pro Arg Arg Arg Thr Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro  
165 170 175

Arg Arg Arg Pro Gln Ser Pro Ala Ser Asn Cys  
180 185

<210> 103  
<211> 188  
<212> PRT  
<213> Woodchuck hepatitis virus

<400> 103

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ser Ser Tyr Gln Leu Leu  
1 5 10 15

Asn Phe Leu Pro Leu Asp Phe Phe Pro Asp Leu Asn Ala Leu Val Asp  
20 25 30

Thr Ala Thr Ala Leu Tyr Glu Glu Glu Leu Thr Gly Arg Glu His Cys  
35 40 45

Ser Pro His His Thr Ala Ile Arg Gln Ala Leu Val Cys Trp Asp Glu  
50 55 60

Leu Thr Lys Leu Ile Ala Trp Met Ser Ser Asn Ile Thr Ser Glu Gln  
65 70 75 80

Val Arg Thr Ile Ile Val Asn His Val Asn Asp Thr Trp Gly Leu Lys  
85 90 95

Val Arg Gln Ser Leu Trp Phe His Leu Ser Cys Leu Thr Phe Gly Gln  
100 105 110

His Thr Val Gln Glu Phe Leu Val Ser Phe Gly Val Trp Ile Arg Thr  
115 120 125

Pro Ala Pro Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
130 135 140

Glu His Thr Val Ile Arg Arg Arg Gly Gly Ala Arg Ala Ser Arg Ser  
145 150 155 160

Pro Arg Arg Arg Thr Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro  
165 170 175

Arg Arg Arg Arg Ser Gln Ser Pro Ser Ala Asn Cys  
180 185

<210> 104  
<211> 188  
<212> PRT  
<213> Woodchuck hepatitis virus

<400> 104

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ser Ser Tyr Gln Leu Leu  
1 5 10 15

Asn Phe Leu Pro Leu Asp Phe Phe Pro Asp Leu Asn Ala Leu Val Asp  
20 25 30

Thr Ala Thr Ala Leu Tyr Glu Glu Glu Leu Thr Gly Arg Glu His Cys  
35 40 45

Ser Pro His His Thr Ala Ile Arg Gln Ala Leu Val Cys Trp Asp Glu  
50 55 60

Leu Thr Lys Leu Ile Ala Trp Met Ser Ser Asn Ile Thr Ser Glu Gln  
65 70 75 80

Val Arg Thr Ile Ile Val Asn His Val Asn Asp Thr Trp Gly Leu Lys  
85 90 95



Val Arg Gln Ser Leu Trp Phe His Leu Ser Cys Leu Thr Phe Gly Gln  
 100 105 110

His Thr Val Gln Glu Phe Leu Val Ser Phe Gly Val Trp Ile Arg Thr  
 115 120 125

Pro Ala Pro Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
 130 135 140

Glu His Thr Val Ile Arg Arg Arg Gly Gly Ala Arg Ala Ser Arg Ser  
 145 150 155 160

Pro Arg Arg Arg Thr Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro  
 165 170 175

Arg Arg Arg Arg Ser Gln Ser Pro Ser Ala Asn Cys  
 180 185

<210> 105  
 <211> 187  
 <212> PRT  
 <213> Woodchuck hepatitis virus

<400> 105

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ser Ser Tyr Gln Leu Leu  
 1 5 10 15

Asn Phe Leu Pro Leu Asp Phe Phe Pro Asp Leu Asn Ala Leu Val Asp  
 20 25 30

Thr Ala Thr Ala Leu Tyr Glu Glu Glu Leu Thr Gly Arg Glu His Cys  
 35 40 45

Ser Pro His His Thr Ala Ile Arg Gln Ala Leu Val Cys Trp Asp Glu  
 50 55 60

Leu Thr Lys Leu Ile Ala Trp Met Ser Ser Asn Ile Thr Ser Glu Gln  
 65 70 75 80

Val Arg Thr Ile Ile Val Asn His Val Asn Asp Thr Trp Gly Leu Lys  
 85 90 95

Val Arg Gln Ser Leu Trp Phe His Leu Ser Cys Leu Thr Phe Gly Gln  
 100 105 110

His Thr Val Gln Glu Phe Leu Val Ser Phe Val Val Trp Ile Arg Thr  
 115 120 125

Pro Ala Pro Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
 130 135 140

Glu His Thr Val Ile Arg Arg Gly Gly Ala Arg Ala Ser Arg Ser Pro  
 145 150 155 160

Arg Arg Arg Thr Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg  
 165 170 175

Arg Arg Arg Ser Gln Ser Pro Ser Ala Asn Cys  
 180 185

<210> 106  
 <211> 188  
 <212> PRT  
 <213> Woodchuck hepatitis virus

<400> 106

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ser Ser Tyr Gln Leu Leu  
 1 5 10 15

Asn Phe Leu Pro Leu Asp Phe Phe Pro Asp Leu Asn Ala Leu Val Asp  
 20 25 30

Thr Ala Thr Ala Leu Tyr Glu Glu Glu Leu Thr Gly Arg Glu His Cys  
 35 40 45

Ser Pro His His Thr Ala Ile Arg Gln Ala Leu Val Cys Trp Asp Glu  
 50 55 60

Leu Thr Lys Leu Ile Ala Trp Met Ser Ser Asn Ile Thr Ser Glu Gln  
 65 70 75 80

Val Arg Thr Ile Ile Val Asn His Val Asn Asp Thr Trp Gly Leu Lys  
 85 90 95

Val Arg Gln Ser Leu Trp Phe His Leu Ser Cys Leu Thr Phe Gly Gln  
 100 105 110

His Thr Val Gln Glu Phe Leu Val Ser Phe Gly Val Trp Ile Arg Thr  
 115 120 125

Pro Ala Pro Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
 130 135 140

Glu His Thr Val Ile Arg Arg Arg Gly Gly Ala Arg Ala Ser Arg Ser  
 145 150 155 160

Pro Arg Arg Arg Thr Pro Ser Pro Arg Arg Arg Ser Gln Ser Pro  
165 170 175

Arg Arg Arg Arg Ser Gln Ser Pro Ser Ala Asn Cys  
180 185

<210> 107  
<211> 188  
<212> PRT  
<213> Woodchuck hepatitis virus

<400> 107

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ser Ser Tyr Gln Leu Leu  
1 5 10 15

Asn Phe Leu Pro Leu Asp Phe Phe Pro Asp Leu Asn Ala Leu Val Asp  
20 25 30

Thr Ala Thr Ala Leu Tyr Glu Glu Glu Leu Thr Gly Arg Glu His Cys  
35 40 45

Ser Pro His His Thr Ala Ile Arg Gln Ala Leu Val Cys Trp Asp Glu  
50 55 60

Leu Thr Lys Leu Ile Ala Trp Met Ser Ser Asn Ile Thr Ser Glu Gln  
65 70 75 80

Val Arg Thr Ile Ile Val Asn His Val Asn Asp Thr Trp Gly Leu Lys  
85 90 95

Val Arg Gln Ser Leu Trp Phe His Leu Ser Cys Leu Thr Phe Gly Gln  
100 105 110

His Thr Val Gln Glu Phe Leu Val Ser Phe Gly Val Trp Ile Arg Thr  
115 120 125

Pro Ala Pro Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
130 135 140

Glu His Thr Val Ile Arg Arg Arg Gly Gly Ala Arg Ala Ser Arg Ser  
145 150 155 160

Pro Arg Arg Arg Thr Pro Ser Pro Arg Arg Arg Ser Gln Ser Pro  
165 170 175

Arg Arg Arg Arg Ser Gln Ser Pro Ser Thr Asn Cys  
180 185

<210> 108  
 <211> 187  
 <212> PRT  
 <213> Ground squirrel hepatitis virus

<400> 108

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ser Ser Tyr Gln Leu Leu  
 1 5 10 15

Asn Phe Leu Pro Leu Asp Phe Phe Pro Asp Leu Asn Ala Leu Val Asp  
 20 25 30

Thr Ala Ala Ala Leu Tyr Glu Glu Glu Leu Thr Gly Arg Glu His Cys  
 35 40 45

Ser Pro His His Thr Ala Ile Arg Gln Ala Leu Val Cys Trp Glu Glu  
 50 55 60

Leu Thr Arg Leu Ile Thr Trp Met Ser Glu Asn Thr Thr Glu Glu Val  
 65 70 75 80

Arg Arg Ile Ile Val Asp His Val Asn Asn Thr Trp Gly Leu Lys Val  
 85 90 95

Arg Gln Thr Leu Trp Phe His Leu Ser Cys Leu Thr Phe Gly Gln His  
 100 105 110

Thr Val Gln Glu Phe Leu Val Ser Phe Gly Val Trp Ile Arg Thr Pro  
 115 120 125

Ala Pro Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro Glu  
 130 135 140

His Thr Val Ile Arg Arg Arg Gly Gly Ser Arg Ala Ala Arg Ser Pro  
 145 150 155 160

Arg Arg Arg Thr Pro Ser Pro Arg Arg Arg Ser Gln Ser Pro Arg  
 165 170 175

Arg Arg Arg Ser Gln Ser Pro Ala Ser Asn Cys  
 180 185

<210> 109  
 <211> 183  
 <212> PRT  
 <213> Human hepatitis B virus

<400> 109

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu  
 1 5 10 15

Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp  
 20 25 30

Thr Ala Ser Ala Leu Tyr Arg Asp Ala Leu Glu Ser Pro Glu His Cys  
 35 40 45

Ser Pro His His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu  
 50 55 60

Leu Met Thr Leu Ala Thr Trp Val Gly Val Asn Leu Glu Asp Pro Ala  
 65 70 75 80

Ser Arg Asp Leu Val Val Ser Tyr Val Asn Thr Asn Met Gly Leu Lys  
 85 90 95

Phe Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Ile Phe Gly Arg  
 100 105 110

Glu Thr Val Ile Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr  
 115 120 125

Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
 130 135 140

Glu Thr Thr Val Val Arg Arg Arg Gly Arg Ser Pro Arg Arg Arg Thr  
 145 150 155 160

Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg Arg Ser  
 165 170 175

Gln Ser Arg Glu Ser Gln Cys  
 180

<210> 110  
 <211> 185  
 <212> PRT  
 <213> Human hepatitis B virus

<400> 110

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu  
 1 5 10 15

Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp  
 20 25 30

Thr Ala Ser Ala Leu Tyr Arg Glu Ala Leu Glu Ser Pro Glu His Cys  
 35 40 45

Ser Pro His His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu  
 50 55 60

Leu Met Thr Leu Ala Thr Trp Val Gly Asn Asn Leu Glu Asp Pro Ala  
 65 70 75 80

Ser Arg Asp Leu Val Val Asn Tyr Val Asn Thr Asn Val Gly Leu Lys  
 85 90 95

Ile Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg  
 100 105 110

Glu Thr Val Leu Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr  
 115 120 125

Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
 130 135 140

Glu Thr Thr Val Val Arg Arg Arg Asp Arg Gly Arg Ser Pro Arg Arg  
 145 150 155 160

Arg Thr Pro Ser Pro Arg Arg Arg Arg Ser Pro Ser Pro Arg Arg Arg  
 165 170 175

Arg Ser Gln Ser Arg Glu Ser Gln Cys  
 180 185

<210> 111  
 <211> 183  
 <212> PRT  
 <213> Human hepatitis B virus

&lt;400&gt; 111

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Ser Val Glu Leu Leu  
 1 5 10 15

Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Ile Arg Asp Leu Leu Asp  
 20 25 30

Thr Ala Ser Ala Leu Tyr Arg Glu Ala Leu Glu Ser Pro Glu His Cys  
 35 40 45

Ser Pro His His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu  
 50 55 60

Leu Met Asn Leu Ala Thr Trp Val Gly Ser Asn Leu Glu Asp Pro Ala  
 65 70 75 80

Ser Arg Glu Leu Val Val Ser Tyr Val Asn Val Asn Met Gly Leu Lys  
 85 90 95

Ile Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg  
 100 105 110

Glu Thr Val Leu Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr  
 115 120 125

Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
 130 135 140

Glu Thr Thr Val Val Arg Arg Arg Gly Arg Ser Pro Arg Arg Arg Thr  
 145 150 155 160

Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg Ser  
 165 170 175

Gln Ser Arg Glu Ser Gln Cys  
 180

&lt;210&gt; 112

&lt;211&gt; 183

&lt;212&gt; PRT

&lt;213&gt; Human hepatitis B virus

&lt;400&gt; 112

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu  
 1 5 10 15

Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp  
 20 25 30

Thr Ala Ser Ala Leu Tyr Arg Glu Ala Leu Glu Ser Pro Glu His Cys  
 35 40 45

Ser Pro His His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu  
 50 55 60

Leu Met Thr Leu Ala Thr Trp Val Gly Val Asn Leu Glu Asp Pro Ala  
 65 70 75 80

Ser Arg Asp Leu Val Val Ser Tyr Val Asn Thr Asn Met Gly Leu Lys  
 85 90 95

Phe Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg  
 100 105 110

Glu Thr Val Ile Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr  
 115 120 125

Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
 130 135 140

Glu Thr Thr Val Val Arg Arg Arg Gly Arg Ser Pro Arg Arg Arg Thr  
 145 150 155 160

Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg Arg Ser  
 165 170 175

Gln Ser Arg Glu Ser Gln Cys  
 180

&lt;210&gt; 113

&lt;211&gt; 183

&lt;212&gt; PRT

&lt;213&gt; Human hepatitis B virus



&lt;400&gt; 113

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu  
 1 5 10 15

Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp  
 20 25 30

Thr Ala Ala Ala Leu Tyr Arg Asp Ala Leu Glu Ser Pro Glu His Cys  
 35 40 45

Ser Pro His His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Asp  
 50 55 60

Leu Met Thr Leu Ala Thr Trp Val Gly Thr Asn Leu Glu Asp Pro Ala  
 65 70 75 80

Ser Arg Asp Leu Val Val Ser Tyr Val Asn Thr Asn Val Gly Leu Lys  
 85 90 95

Phe Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg  
 100 105 110

Glu Thr Val Leu Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr  
 115 120 125

Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
 130 135 140

Glu Thr Thr Val Val Arg Arg Arg Gly Arg Ser Pro Arg Arg Arg Thr  
 145 150 155 160

Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg Arg Ser  
 165 170 175

Gln Ser Arg Glu Ser Gln Cys  
 180

&lt;210&gt; 114

&lt;211&gt; 183

&lt;212&gt; PRT

&lt;213&gt; Human hepatitis B virus

&lt;400&gt; 114

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Ser Val Glu Leu Leu  
 1 5 10 15

Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Ile Arg Asp Leu Leu Asp  
 20 25 30

Thr Ala Ser Ala Leu Tyr Arg Glu Ala Leu Glu Ser Pro Glu His Cys  
 35 40 45

Ser Pro His His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu  
 50 55 60

Leu Met Asn Leu Ala Thr Trp Val Gly Ser Asn Leu Glu Asp Pro Ala  
 65 70 75 80

Ser Arg Glu Leu Val Val Ser Tyr Val Asn Val Asn Met Gly Leu Lys  
 85 90 95

Ile Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg  
 100 105 110

Glu Thr Val Leu Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr  
 115 120 125

Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
 130 135 140

Glu Thr Thr Val Val Arg Arg Arg Gly Arg Ser Pro Arg Arg Arg Thr  
 145 150 155 160

Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg Arg Ser  
 165 170 175

Gln Ser Arg Glu Ser Gln Cys  
 180

&lt;210&gt; 115

&lt;211&gt; 183

&lt;212&gt; PRT

&lt;213&gt; Chimpanzee hepatitis B virus

&lt;400&gt; 115

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu  
 1 5 10 15

Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp  
 20 25 30

Thr Ala Ser Ala Leu Tyr Arg Glu Ala Leu Glu Ser Pro Glu His Cys  
 35 40 45

Ser Pro Asn His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu  
 50 55 60

Leu Met Thr Leu Ala Ser Trp Val Gly Asn Asn Leu Glu Asp Pro Ala  
 65 70 75 80

Ser Arg Glu Gln Val Val Asn Tyr Val Asn Thr Asn Met Gly Leu Lys  
 85 90 95

Ile Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg  
 100 105 110

Glu Thr Val Leu Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr  
 115 120 125

Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
 130 135 140

Glu Thr Thr Val Val Arg Arg Arg Gly Arg Ser Pro Arg Arg Arg Thr  
 145 150 155 160

Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg Ser  
 165 170 175

Gln Ser Pro Ala Ser Gln Cys  
 180

&lt;210&gt; 116

&lt;211&gt; 183

&lt;212&gt; PRT

&lt;213&gt; Gibbon hepatitis B virus

&lt;400&gt; 116

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu  
 1 5 10 15

Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp  
 20 25 30

Thr Ala Ser Ala Leu Tyr Arg Glu Ala Leu Glu Ser Pro Glu His Cys  
 35 40 45

Ser Pro Asn His Thr Ala Leu Arg Gln Ala Val Leu Cys Trp Gly Glu  
 50 55 60

Leu Met Thr Leu Ala Ser Trp Val Gly Asn Asn Leu Glu Asp Pro Ala  
 65 70 75 80

Ser Arg Glu Leu Val Val Ser Tyr Val Asn Asn Asn Met Gly Leu Lys  
 85 90 95

Ile Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg  
 100 105 110

Glu Thr Val Leu Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr  
 115 120 125

Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
 130 135 140

Glu Thr Thr Val Val Arg Arg Arg Gly Arg Ser Pro Arg Arg Arg Thr  
 145 150 155 160

Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg Ser  
 165 170 175

Gln Ser Pro Ala Ser Gln Cys  
 180

&lt;210&gt; 117

&lt;211&gt; 183

&lt;212&gt; PRT

&lt;213&gt; Orangutan hepatitis virus

&lt;400&gt; 117

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu  
 1 5 10 15

Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp  
 20 25 30

Thr Ala Ser Ala Leu Tyr Arg Glu Ala Leu Glu Ser Pro Glu His Cys  
 35 40 45

Ser Pro Asn His Thr Ala Leu Arg Gln Ala Val Leu Cys Trp Gly Glu  
 50 55 60

Leu Met Thr Leu Ala Ser Trp Val Gly Asn Asn Leu Glu Asp Pro Ala  
 65 70 75 80

Ser Arg Glu Leu Val Val Asn Tyr Val Asn Asn Asn Met Gly Leu Lys  
 85 90 95

Ile Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg  
 100 105 110

Glu Thr Val Leu Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr  
 115 120 125

Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
 130 135 140

Glu Thr Thr Val Val Arg Arg Arg Gly Arg Ser Pro Arg Arg Arg Thr  
 145 150 155 160

Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg Arg Ser  
 165 170 175

Gln Ser Pro Ala Ser Gln Cys  
 180

&lt;210&gt; 118

&lt;211&gt; 182

&lt;212&gt; PRT

&lt;213&gt; Woolly monkey hepatitis virus

&lt;400&gt; 118

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu  
 1 5 10 15

Ser Phe Leu Pro Ala Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp  
 20 25 30

Thr Ala Ser Ala Leu Tyr Arg Glu Ala Leu Glu Ser Ser Asp His Cys  
 35 40 45

Ser Pro His His Thr Ala Leu Arg Gln Thr Val Leu Cys Trp Gly Glu  
 50 55 60

Leu Met Ser Leu Ala Ser Trp Val Gly Thr Asn Leu Glu Asp Pro Ala  
 65 70 75 80

Ala Arg Glu Leu Val Val Ser Tyr Val Asn Asp Asn Met Gly Leu Lys  
 85 90 95

Val Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg  
 100 105 110

Glu Thr Val Leu Glu Tyr Leu Val Ser Phe Trp Val Trp Ile Arg Thr  
 115 120 125

Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
 130 135 140

Glu Thr Thr Val Val Arg Arg Arg Arg Pro Ser Gly Arg Arg Thr Pro  
 145 150 155 160

Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg Arg Ser Gln  
 165 170 175

Ser Pro Ala Ser Ser Cys  
 180

&lt;210&gt; 119

&lt;211&gt; 262

&lt;212&gt; PRT

&lt;213&gt; Duck hepatitis virus

&lt;400&gt; 119

Met Asp Ile Asn Ala Ser Arg Ala Leu Ala Asn Val Tyr Asp Leu Pro  
 1 5 10 15

Asp Asp Phe Phe Pro Lys Ile Asp Asp Leu Val Arg Asp Ala Lys Asp  
 20 25 30

Ala Leu Glu Pro Tyr Trp Lys Ser Asp Ser Ile Lys Lys His Val Leu  
 35 40 45

Ile Ala Thr His Phe Val Asp Leu Ile Glu Asp Phe Trp Gln Thr Thr  
 50 55 60

Gln Gly Met His Glu Ile Ala Glu Ser Leu Arg Ala Val Ile Pro Pro  
 65 70 75 80

Thr Thr Ala Pro Val Pro Thr Gly Tyr Leu Ile Gln His Glu Glu Ala  
 85 90 95

Glu Glu Ile Pro Leu Gly Asp Leu Phe Lys His Gln Glu Glu Arg Ile  
 100 105 110

Val Ser Phe Gln Pro Asp Tyr Pro Ile Thr Ala Arg Ile His Ala His  
 115 120 125

Leu Lys Ala Tyr Ala Lys Ile Asn Glu Glu Ser Leu Asp Arg Ala Arg  
 130 135 140

Arg Leu Leu Trp Trp His Tyr Asn Cys Leu Leu Trp Gly Glu Ala Asn  
 145 150 155 160

Val Thr Asn Tyr Ile Ser Arg Leu Arg Thr Trp Leu Ser Thr Pro Glu  
 165 170 175

Lys Tyr Arg Gly Arg Asp Ala Pro Thr Ile Glu Ala Ile Thr Arg Pro  
 180 185 190

Ile Gln Val Ala Gln Gly Gly Arg Lys Thr Ser Ser Gly Thr Arg Lys  
 195 200 205

Pro Arg Gly Leu Glu Pro Arg Arg Arg Lys Val Lys Thr Thr Phe Val  
 210 215 220

Tyr Gly Arg Arg Arg Ser Lys Ser Arg Glu Arg Arg Ala Pro Ser Pro  
 225 230 235 240





Ile Gln Val Ala Gln Gly Gly Arg Lys Thr Thr Thr Gly Thr Arg Lys  
 195 200 205

Pro Arg Gly Leu Glu Pro Arg Arg Arg Lys Val Lys Thr Thr Val Val  
 210 215 220

Tyr Gly Arg Arg Arg Ser Lys Ser Arg Glu Arg Arg Ala Pro Thr Pro  
 225 230 235 240

Gln Arg Ala Gly Ser Pro Leu Pro Arg Ser Ser Ser Ser His His Arg  
 245 250 255

Ser Pro Ser Pro Arg Lys  
 260

<210> 121  
 <211> 262  
 <212> PRT  
 <213> Duck hepatitis virus

<400> 121

Met Asp Ile Asn Ala Ser Arg Ala Leu Ala Asn Val Tyr Asp Leu Pro  
 1 5 10 15

Asp Asp Phe Phe Pro Lys Ile Asp Asp Leu Val Arg Asp Ala Lys Asp  
 20 25 30

Ala Leu Glu Pro Tyr Trp Lys Ser Asp Ser Ile Lys Lys His Val Leu  
 35 40 45

Ile Ala Thr His Phe Val Asp Leu Ile Glu Asp Phe Trp Gln Thr Thr  
 50 55 60

Gln Gly Met His Glu Ile Ala Glu Ser Leu Arg Ala Val Ile Pro Pro  
 65 70 75 80

Thr Thr Ala Pro Val Pro Thr Gly Tyr Leu Ile Gln His Glu Glu Ala  
 85 90 95

Glu Glu Ile Pro Leu Gly Asp Leu Phe Lys His Gln Glu Glu Arg Ile  
 100 105 110

Val Ser Phe Gln Pro Asp Tyr Pro Ile Thr Ala Arg Ile His Ala His  
 115 120 125

Leu Lys Ala Tyr Ala Lys Ile Asn Glu Glu Ser Leu Asp Arg Ala Arg  
 130 135 140

Arg Leu Leu Trp Trp His Tyr Asn Cys Leu Leu Trp Gly Glu Ala Asn  
145 150 155 160

Val Thr Asn Tyr Ile Ser Arg Leu Arg Thr Trp Leu Ser Thr Pro Glu  
165 170 175

Lys Tyr Arg Gly Arg Asp Ala Pro Thr Ile Glu Ala Ile Thr Arg Pro  
180 185 190

Ile Gln Val Ala Gln Gly Gly Arg Lys Thr Ser Ser Gly Thr Arg Lys  
195 200 205

Pro Arg Gly Leu Glu Pro Arg Arg Arg Lys Val Lys Thr Thr Val Val  
210 215 220

Tyr Gly Arg Arg Arg Ser Lys Ser Arg Asp Arg Arg Ala Pro Ser Pro  
225 230 235 240

Gln Arg Ala Gly Ser Pro Leu Pro Arg Ser Ser Ser Ser His His Arg  
245 250 255

Ser Pro Ser Pro Arg Lys  
260

<210> 122  
<211> 262  
<212> PRT  
<213> Duck hepatitis virus

<400> 122

Met Asp Ile Asn Ala Ser Arg Ala Leu Ala Asn Val Tyr Asp Leu Pro  
1 5 10 15

Asp Asp Phe Phe Pro Lys Ile Asp Asp Leu Val Arg Asp Ala Lys Asp  
20 25 30

Ala Leu Glu Pro Tyr Trp Lys Ser Asp Ser Ile Lys Lys His Val Leu  
35 40 45

Ile Ala Thr His Phe Val Asp Leu Ile Glu Asp Phe Trp Gln Thr Thr  
50 55 60

Gln Gly Met His Glu Ile Ala Glu Ser Leu Arg Ala Val Ile Pro Pro  
65 70 75 80

Thr Thr Ala Pro Val Pro Thr Gly Tyr Leu Ile Gln His Glu Glu Ala  
85 90 95

Glu Glu Ile Pro Leu Gly Asp Leu Phe Lys His Gln Glu Glu Arg Ile  
 100 105 110

Val Ser Phe Gln Pro Asp Tyr Pro Ile Thr Ala Arg Ile His Ala His  
 115 120 125

Leu Lys Ala Tyr Ala Lys Ile Asn Glu Glu Ser Leu Asp Arg Ala Arg  
 130 135 140

Arg Leu Leu Trp Trp His Tyr Asn Cys Leu Leu Trp Gly Glu Ala Asn  
 145 150 155 160

Val Thr Asn Tyr Ile Ser Arg Leu Arg Thr Trp Leu Ser Thr Pro Glu  
 165 170 175

Lys Tyr Arg Gly Arg Asp Ala Pro Thr Ile Glu Ala Ile Thr Arg Pro  
 180 185 190

Ile Gln Val Ala Gln Gly Gly Arg Lys Thr Ser Ser Gly Thr Arg Lys  
 195 200 205

Pro Arg Gly Leu Glu Pro Arg Arg Arg Lys Val Lys Thr Thr Val Val  
 210 215 220

Tyr Gly Arg Arg Arg Ser Lys Ser Arg Glu Arg Arg Ala Pro Ser Pro  
 225 230 235 240

Gln Arg Ala Gly Ser Pro Leu Pro Arg Ser Ser Ser Ser His His Arg  
 245 250 255

Ser Pro Ser Pro Arg Lys  
 260

<210> 123  
 <211> 262  
 <212> PRT  
 <213> Duck hepatitis virus

<400> 123

Met Asp Ile Asn Ala Ser Arg Ala Leu Ala Asn Val Tyr Asp Leu Pro  
 1 5 10 15

Asp Asp Phe Phe Pro Lys Ile Asp Asp Leu Val Arg Asp Ala Lys Asp  
 20 25 30

Ala Leu Glu Pro Tyr Trp Lys Ser Asp Ser Ile Lys Lys His Val Leu  
 35 40 45

Ile Ala Thr His Phe Val Asp Leu Ile Glu Asp Phe Trp Gln Thr Thr  
 50 55 60

Gln Gly Met His Glu Ile Ala Glu Ser Leu Arg Ala Val Ile Pro Pro  
 65 70 75 80

Thr Thr Ala Pro Val Pro Thr Gly Tyr Leu Ile Gln His Glu Glu Ala  
 85 90 95

Glu Glu Ile Pro Leu Gly Asp Leu Phe Lys His Gln Glu Glu Arg Ile  
 100 105 110

Val Ser Phe Gln Pro Asp Tyr Pro Ile Thr Ala Arg Ile His Ala His  
 115 120 125

Leu Lys Ala Tyr Ala Lys Ile Asn Glu Glu Ser Leu Asp Arg Ala Arg  
 130 135 140

Arg Leu Leu Trp Trp His Tyr Asn Cys Leu Leu Trp Gly Glu Ala Asn  
 145 150 155 160

Val Thr Asn Tyr Ile Ser Arg Leu Arg Thr Trp Leu Ser Thr Pro Glu  
 165 170 175

Lys Tyr Arg Gly Arg Asp Ala Pro Thr Ile Glu Ala Ile Thr Arg Pro  
 180 185 190

Ile Gln Ala Ala Gln Gly Gly Arg Lys Thr Ser Ser Gly Thr Arg Lys  
 195 200 205

Pro Arg Gly Leu Glu Pro Arg Arg Arg Lys Val Lys Thr Thr Val Val  
 210 215 220

Tyr Gly Arg Arg Arg Ser Lys Ser Arg Glu Arg Arg Ala Pro Ser Pro  
 225 230 235 240

Gln Arg Ala Gly Ser Pro Leu Pro Arg Ser Ser Ser Ser His His Arg  
 245 250 255

Ser Pro Ser Pro Arg Lys  
 260

<210> 124  
 <211> 262  
 <212> PRT  
 <213> Duck hepatitis virus

<400> 124

Met Asp Ile Asn Ala Ser Arg Ala Leu Ala Asn Val Tyr Asp Leu Pro  
 1 5 10 15

Asp Asp Phe Phe Pro Lys Ile Asp Asp Leu Val Arg Asp Ala Lys Asp  
 20 25 30

Ala Leu Glu Pro Tyr Trp Lys Ser Asp Ser Ile Lys Lys His Val Leu  
 35 40 45

Ile Ala Thr His Phe Val Asp Leu Ile Glu Asp Phe Trp Gln Thr Thr  
 50 55 60

Gln Gly Met His Glu Ile Ala Glu Ser Leu Arg Ala Val Ile Pro Pro  
 65 70 75 80

Thr Thr Ala Pro Val Pro Thr Gly Tyr Leu Ile Gln His Glu Glu Ala  
 85 90 95

Glu Glu Ile Pro Leu Gly Asp Leu Phe Lys His Gln Glu Glu Arg Ile  
 100 105 110

Val Ser Phe Gln Pro Asp Tyr Pro Ile Thr Ala Arg Ile His Ala His  
 115 120 125

Leu Lys Ala Tyr Ala Lys Ile Asn Glu Glu Ser Leu Asp Arg Ala Arg  
 130 135 140

Arg Leu Leu Trp Trp His Tyr Asn Cys Leu Leu Trp Gly Glu Ala Asn  
 145 150 155 160

Val Thr Asn Tyr Ile Ser Arg Leu Arg Thr Trp Leu Ser Thr Pro Glu  
 165 170 175

Lys Tyr Arg Gly Arg Asp Ala Pro Thr Ile Glu Ala Ile Thr Arg Pro  
 180 185 190

Ile Gln Ala Ala Gln Gly Gly Arg Lys Thr Ser Ser Gly Thr Arg Lys  
 195 200 205

Pro Arg Gly Leu Glu Pro Arg Arg Arg Lys Val Lys Thr Thr Val Val  
 210 215 220

Tyr Gly Arg Arg Arg Ser Lys Ser Arg Glu Arg Arg Ala Pro Ser Pro  
 225 230 235 240

Gln Arg Ala Gly Ser Pro Leu Pro Arg Ser Ser Ser Ser His His Arg  
 245 250 255

Ser Pro Ser Pro Arg Lys  
 260

<210> 125  
 <211> 262  
 <212> PRT  
 <213> Ross' goose hepatitis virus

<400> 125

Met Asp Ile Asn Ala Ser Arg Ala Leu Ala Asn Val Tyr Asp Leu Pro  
 1 5 10 15

Asp Asp Phe Phe Pro Lys Ile Asp Asp Leu Val Arg Asp Ala Lys Asp  
 20 25 30

Ala Leu Glu Pro Tyr Trp Arg Asn Asp Ser Ile Lys Lys His Val Leu  
 35 40 45

Ile Ala Thr His Phe Val Asp Leu Ile Glu Asp Phe Trp Gln Thr Thr  
 50 55 60

Gln Gly Met His Glu Ile Ala Glu Ala Leu Arg Ala Ile Ile Pro Ala  
 65 70 75 80

Thr Thr Ala Pro Val Pro Gln Gly Phe Leu Val Gln His Glu Glu Ala  
 85 90 95

Glu Glu Ile Pro Leu Gly Glu Leu Phe Arg Tyr Gln Glu Glu Arg Leu  
 100 105 110

Thr Asn Phe Gln Pro Asp Tyr Pro Val Thr Ala Arg Ile His Ala His  
 115 120 125

Leu Lys Ala Tyr Ala Lys Ile Asn Glu Glu Ser Leu Asp Arg Ala Arg  
 130 135 140

Arg Leu Leu Trp Trp His Tyr Asn Cys Leu Leu Trp Gly Glu Pro Asn  
 145 150 155 160

Val Thr Asn Tyr Ile Ser Arg Leu Arg Thr Trp Leu Ser Thr Pro Glu  
 165 170 175

Lys Tyr Arg Gly Lys Asp Ala Pro Thr Ile Glu Ala Ile Thr Arg Pro  
 180 185 190

Ile Gln Val Ala Gln Gly Gly Arg Asn Lys Thr Gln Gly Val Arg Lys  
 195 200 205

Ser Arg Gly Leu Glu Pro Arg Arg Arg Arg Val Lys Thr Thr Ile Val  
 210 215 220

Tyr Gly Arg Arg Arg Ser Lys Ser Arg Glu Arg Arg Ala Pro Thr Pro  
 225 230 235 240

Gln Arg Ala Gly Ser Pro Leu Pro Arg Thr Ser Arg Asp His His Arg  
 245 250 255

Ser Pro Ser Pro Arg Glu  
 260

<210> 126

<211> 262

<212> PRT

<213> Heron hepatitis virus

<400> 126

Met Asp Val Asn Ala Ser Arg Ala Leu Ala Asn Val Tyr Asp Leu Pro  
 1 5 10 15

Asp Asp Phe Phe Pro Gln Ile Asp Asp Leu Val Arg Asp Ala Lys Asp  
 20 25 30

Ala Leu Glu Pro Tyr Trp Lys Ala Glu Thr Ile Lys Lys His Val Leu  
 35 40 45

Ile Ala Thr His Phe Val Asp Leu Ile Glu Asp Phe Trp Gln Thr Thr  
 50 55 60

Gln Gly Met Ser Gln Ile Ala Asp Ala Leu Arg Ala Val Ile Pro Pro  
 65 70 75 80

Thr Thr Val Pro Val Pro Glu Gly Phe Leu Ile Thr His Ser Glu Ala  
 85 90 95

Glu Glu Ile Pro Leu Asn Asp Leu Phe Ser Asn Gln Glu Glu Arg Ile  
 100 105 110

Val Asn Phe Gln Pro Asp Tyr Pro Ile Thr Ala Arg Ile His Thr His  
 115 120 125

Leu Arg Val Tyr Thr Lys Leu Asn Glu Gln Ala Leu Asp Lys Ala Arg  
 130 135 140  
 Arg Leu Leu Trp Trp His Tyr Asn Cys Leu Leu Trp Gly Glu Ala Thr  
 145 150 155 160  
 Val Thr Asn Tyr Ile Ser Arg Leu Arg Thr Trp Leu Ser Thr Pro Glu  
 165 170 175  
 Lys Tyr Arg Gly Lys Asp Ala Pro Thr Ile Glu Ala Ile Thr Arg Pro  
 180 185 190  
 Ile Gln Val Ala Gln Gly Gly Arg Asn Gln Thr Lys Gly Thr Arg Lys  
 195 200 205  
 Pro Arg Gly Leu Glu Pro Arg Arg Arg Lys Val Lys Thr Thr Val Val  
 210 215 220  
 Tyr Gly Arg Arg Arg Ser Lys Ser Arg Gly Arg Arg Ser Ser Pro Ser  
 225 230 235 240  
 Gln Arg Ala Gly Ser Pro Leu Pro Arg Asn Arg Gly Asn Gln Thr Arg  
 245 250 255  
 Ser Pro Ser Pro Arg Glu  
 260

<210> 127  
 <211> 564  
 <212> DNA  
 <213> Arctic ground squirrel hepatitis virus

<400> 127  
 atggacatag atccctataa agaatttggt tcatcctacc agttgttgaa ttttcttctt 60  
 ttggacttct ttccctgaact caatgccttg gtggacactg ctactgctct ctatgaagaa 120  
 gaattaacag gtagggagca ctgctctcct catcacacag ctatcagaca agcttttagtt 180  
 tgctgggaag aattaacaag attaattgcg tggatgagtg ctaacattaa ttcagaagaa 240  
 gtaagaagag ttatagttgc tcatgtcaat gacacttggg gacttaaagt taggcagaat 300  
 ttatggtttc acttatcctg tctgactttt gggcaacaca cagtgcagga atttttagtc 360  
 agctttggag taaggatcag aactccggct ccttatagac ctactaatgc acccattctc 420  
 tcaactcttc cggaacatac agtcattagg agaagaggaa gtgcaagagt tgtaggtcc 480  
 ccagaagac gcactccctc tcctcgcagg agaagatctc aatcaccgcg tcgcaggcct 540  
 caatctccag cttccaactg ctga 564



<210> 128  
 <211> 564  
 <212> DNA  
 <213> Ground squirrel hepatitis virus

<400> 128  
 atggacatag atccctataa agaatttggt tcttcttatac agttgttgaa ttttcttcct 60  
 ttggactttt ttcctgatct caatgcattg gtggacactg ctgctgctct ttatgaagaa 120  
 gaattaacag gtagggagca ttgttctcct catcactg ctattagaca ggccttagtg 180  
 tgttgggaag aattaactag attaattaca tggatgagtg aaaatacaac agaagaagtt 240  
 agaagaatta ttgttgatca tgtcaataat acttggggac ttaaagtaag acagacttta 300  
 tggtttcatt tatcatgtct tacttttggga caacacacag ttcaagaatt tttggttagt 360  
 tttggagtat ggattagaac tccagctcct tatagaccac ctaatgcacc cattttatca 420  
 actcttcogg aacatacagt cattaggaga agaggaggtt caagagctgc taggtcccc 480  
 cgaagacgca ctccctctcc tcgcaggaga aggtctcaat caccgcgtcg cagacgtct 540  
 caatctccag cttccaactg ctga 564

<210> 129  
 <211> 567  
 <212> DNA  
 <213> Woodchuck hepatitis virus

<400> 129  
 atggacatag atccttataa agaatttggt tcatcttatac agttgttgaa ttttcttcct 60  
 ttggactttt ttcctgacct taatgctttg gtggacactg ctactgcctt gtatgaagaa 120  
 gaactaacag gtagggaaca ttgctctccg caccatacag ctattagaca agcttttagta 180  
 tgctgggatg aattaactaa attaatagct tggatgagct ctaacataac ttctgaacaa 240  
 gtaagaacaa tcattgtaaa tcatgtcaat gatacctggg gacttaaggt gagacaaagt 300  
 ttatggtttc atttgtcatg tctcactttc ggacaacata cagttcaaga atttttagta 360  
 agttttggag tatggattag gactccagct ccatatagac ctctaatgc acccattctc 420  
 tcgactcttc cggaacatac agtcattagg agaagaggag gtgcaagagc ttctaggtcc 480  
 ccagaagac gcactccctc tctcgcagg agaagatctc aatcaccgcg tcgcagacgc 540  
 tctcaatctc catctaccaa ctgctga 567

<210> 130  
 <211> 567  
 <212> DNA  
 <213> Woodchuck hepatitis virus

<400> 130  
 atggacatag atccctataa agaatttggt tcatcttatac agttgttgaa ttttcttctc 60  
 ttggacttct ttctgacct taatgctttg gtggacactg ctactgcctt gtatgaagaa 120  
 gagctaacag gtagggaaca ttgctctccg caccatacag ctattagaca agcttttagta 180  
 tgctgggatg aattaactaa attgatagct tggatgagct ctaacataac ttctgaacaa 240  
 gtaagaacaa tcatagtaaa tcatgtcaat gatacctggg gacttaaggt gagacaaagt 300  
 ttatggtttc atttgtcatg tctcactttt ggacaacata cagttcaaga atttttagta 360  
 agttttggag tatggatcag aactccagct ccatatagac ctccaatgc acccattctc 420  
 tcgactcttc cggaacatac agtcattagg agaagaggag gtgcaagagc ttctagggcc 480  
 cccagaagac gcactccctc tcctcgcagg agaagatctc aatcaccgcg tcgcagacgc 540  
 tctcaatctc catctgcca ctgctga 567

<210> 131  
 <211> 564  
 <212> DNA  
 <213> Woodchuck hepatitis virus

<400> 131  
 atggacatag atccctataa agaatttggt tcatcttatac agttgttgaa ttttcttctc 60  
 ttggacttct ttctgacct taatgctttg gtggacactg ctactgcctt gtatgaagaa 120  
 gagctaacag gtagggaaca ttgctctccg caccatacag ctattagaca agcttttagta 180  
 tgctgggatg aattaactaa attgatagct tggatgagct ctaacataac ttctgaacaa 240  
 gtaagaacaa tcatagtaaa tcatgtcaat gatacctggg gacttaaggt gagacaaagt 300  
 ttatggtttc atttgtcatg tctcactttt ggacaacata cagttcaaga atttttagta 360  
 agttttgtag tatggatcag aactccagct ccatatagac ctccaatgc acccattctc 420  
 tcgactcttc cggaacatac agtcattaga agaggagggt caagagcttc taggtcccc 480  
 agaagacgca ctccctctcc tcgcaggaga agatctcaat caccgcgtcg cagacgctct 540  
 caatctccat ctgccaaactg ctga 564

<210> 132  
 <211> 567  
 <212> DNA  
 <213> Woodchuck hepatitis virus

<400> 132  
 atggacatag atccctataa agaatttggt tcatcttatac agttgttgaa ttttcttctc 60  
 ttggacttct ttctgacct taatgctttg gtggacactg ctactgcctt gtatgaagaa 120  
 gagctaacag gtagggaaca ttgctctccg caccatacag ctattagaca agcttttagta 180  
 tgctgggatg aattaactaa attgatagct tggatgagct ctaacataac ttctgaacaa 240

gtaagaacaa tcatagtaaa tcatgtcaat gatacctggg gacttaaggt gagacaaagt 300  
 ttatgggttc atttgtcatg tctcactttc ggacaacata cagttcaaga attttttagta 360  
 agttttggag tatggatcag aactccagct ccatatagac ctccaatgc acccattctc 420  
 tcgactcttc cggaacatac agtcattagg agaagaggag gtgcaagagc ttctagggtcc 480  
 cccagaagac gcactccctc tcctcgcagg agaagatctc aatcaccgcg tcgcagacgc 540  
 tctcaatctc catctgccaa ctgctga 567

<210> 133  
 <211> 567  
 <212> DNA  
 <213> Woodchuck hepatitis virus

<400> 133  
 atggacatag atccttataa agaatttggg tcatcttate agttgttgaa ttttcttcct 60  
 ttggacttct ttctgatct taatgctttg gtggacactg ctactgcctt gtatgaagaa 120  
 gaactaacag gtagggaaca ttgctctccg caccatacag ctattagaca agcttttagta 180  
 tgctgggatg aattaactaa attgatagct tggatgagct ctaacataac ttctgaacaa 240  
 gtaagaacaa tcattgtaaa tcatgtcaat gatacctggg gacttaaggt gagacaaagt 300  
 ttatgggttc atttgtcatg tctcactttc ggacaacata cagttcaaga attttttagta 360  
 agttttggag tatggatcag gactccagct ccatatagac ctccaatgc acccattctc 420  
 tcgactcttc cggaacatac agtcattagg agaagaggag gtgcaagagc ttctagggtcc 480  
 cccagaagac gcactccctc tcctcgcagg agaagatctc aatcaccgcg tcgcagacgc 540  
 tctcaatctc catctgccaa ctgctga 567

<210> 134  
 <211> 552  
 <212> DNA  
 <213> Orangutan hepatitis virus

<400> 134  
 atggacattg acccttataa agaatttggg gctactgtgg agttactctc ttttttgcct 60  
 tcggattttct ttccgtctgt cagagatcta ctgcacaccg catcagccct gtatcgggaa 120  
 gccttagagt ctccagaaca ttgttcacct aaccacacag cactcaggca agcagttctg 180  
 tgctgggggtg agttaatgac tctggcttcc tgggtgggta ataatttggg agaccagca 240  
 tctaggggaac tggtagttaa ttatgtcaac aataatatgg ggctaaaaat cagacaacta 300  
 ctgtgggttc acatttcctg tcttactttt ggaagagaaa cagttttaga atatttggtg 360  
 tcttttggag tgtggattcg cactcctcct gcgtacagac caccaaatgc ccctatcttg 420

tcaacacttc cggaaactac tgttggttaga cgaagaggca ggtcccctag aagaagaact 480  
 ccctcgcttc gcagacgaag gtctcaatca ccgcgtcgca gaagatctca atctccagct 540  
 tcccaatggt ag 552

<210> 135  
 <211> 549  
 <212> DNA  
 <213> Woolly monkey hepatitis virus

<400> 135  
 atggacattg atccttataa agaatttggc gctactgttg agttattgtc ttttttgctt 60  
 gctgacttct ttccttccgt acgggatttg ctggacacag cttctgctct gtatagagaa 120  
 gccctggagt cttccgacca ctgttcaccg caccatactg ccttgaggca gacggtagctg 180  
 tgctggggag aattaatgtc cttagcttct tgggtgggaa ctaatttggg ggatcctgct 240  
 gctagagaat tagtggttag ctatgtcaat gacaacatgg gactgaagggt gagacaactc 300  
 ctttggttcc atatttctg tctcactttt ggtagggaaa ctgttttggg atatctgggtt 360  
 tctttttggg tgtggatagc cacacctcct gcatatagac cacccaatgc ccctatctta 420  
 tcaacacttc cggaaactac tgttggttaga cgaaggagac cctctggaag acgcactccc 480  
 tcgcctcgca gacgaagatc tcaatcgccg cgctcgagaa ggtctcaatc tccagcatct 540  
 tcctggttag 549

<210> 136  
 <211> 552  
 <212> DNA  
 <213> Gibbon hepatitis B virus

<400> 136  
 atggacattg acccttataa agaatttggg gctactgttg agttactctc ttttttgctt 60  
 tctgacttct ttcgctcggt tagagatctc cttgacaccg cctcagctct atctcgggaa 120  
 gccctagagt ctccagaaca ttgttcacct aatcatacag cactcaggca agctgttttg 180  
 tgctgggggtg agttgatgac tctggcttcc tgggtgggca ataatttggg agatccagca 240  
 tctagggaaac tagtagtcag ttatgttaat aataacatgg gtctaaaaat caggcaacta 300  
 ttgtgggttc acatttctg tcttactttt ggaagagaaa ctgtccttga gtatttagtg 360  
 tcttttggag tgtggattcg cactcctcca gcttacagac caccaaatgc ccctatctta 420  
 tccactcttc cggagactac tgttggttaga cgaagaggca ggtcccctag aagaagaact 480  
 ccctcgcttc gcagacgaag gtctcaatcg ccgcgtcgca gaagatctca atctccagct 540  
 tcccaatggt ag 552

<210> 137  
 <211> 552  
 <212> DNA  
 <213> Chimpanzee hepatitis B virus

<400> 137  
 atggacattg acccttataa agaatttgga gctacagtgg agttactctc ttttttgcc 60  
 tctgatttct ttccgtcggc ccgtgatctc ctcgacaccg cctcagctct gtaccgggaa 120  
 gccttagagt ctccagagca ctgttcacct aaccatacag cacttaggca agctatactg 180  
 tgctgggggtg agttaatgac tctggcctcc tgggtgggca ataatttgga agatccagca 240  
 tccagggaaac aagtagttaa ttatgtcaat accaatatgg gtttaaagat cagacaatta 300  
 ttgtgggttct atatttcctg tcttactttt ggaagagaaa ctgtccttga gtatttggtg 360  
 tcttttggag tgtggattcg cactcccccc gcttatagac caccaaagtc ccctatctta 420  
 tcaacacttc cggaaactac tggtgttaga cgacgaggca ggtcccctag aagaagaact 480  
 ccctcgcttc gcagacgaag gtctcaatcg ccgcgtcgca gaagatctca atctccagct 540  
 tcccaatggt ag 552

<210> 138  
 <211> 552  
 <212> DNA  
 <213> Human hepatitis B virus

<400> 138  
 atggacattg acccttataa agaatttgga gctaccgtgg agttactctc gtttttgcc 60  
 tctgacttct ttccctcagt acgagatctt ctagataccg cctcagctct gtatcgggat 120  
 gccttagagt ctctgagca ttgttcacct caccatactg cactcaggca agcaattctt 180  
 tgctggggggg aactaatgac tctagctacc tgggtgggtg ttaatttgga agatccagca 240  
 tctagggacc tagtagtcag ttatgtcaac actaatatgg gcctaaagtt cagacaactc 300  
 ttgtgggttct acatttcttg tctcattttt ggaagagaaa cagttataga gtatttggtg 360  
 tctttcggag tgtggattcg cactcctcca gcttatagac caccaaagtc ccctatccta 420  
 tcaacacttc cggagactac tggtgttaga cgacgaggca ggtcccctag aagaagaact 480  
 ccctcgcttc gcagacgaag gtctcaatcg ccgcgtcgca gaagatctca atctcgggaa 540  
 tctcaatggt ag 552

<210> 139  
 <211> 558  
 <212> DNA  
 <213> Human hepatitis B virus

<400> 139  
 atggacattg acccttataa agaatttga gctactgtgg agttactctc gtttttgcct 60  
 tctgacttct ttccttccgt cagagatctc ctagacaccg cctcagctct gtatcgagaa 120  
 gccttagagt ctcttgagca ttgctcacct caccatactg cactcaggca agccattctc 180  
 tgctgggggg aattgatgac tctagctacc tgggtgggta ataatttga agatccagca 240  
 tctagggatc ttgtagtaaa ttatgttaat actaacgtgg gtttaaagat caggcaacta 300  
 ttgtgggttc atatatcttg ccttactttt ggaagagaga ctgtacttga atatttggtc 360  
 tctttcggag tgtggattcg cactcctcca gcctatagac caccaaatgc ccctatctta 420  
 tcaacacttc cggaaactac tgttggtaga cgacgggacc gaggcaggtc ccctagaaga 480  
 agaactccct cgctcgcag acgcagatct ccatcgccgc gtcgcagaag atctcaatct 540  
 cgggaatctc aatgttag 558

<210> 140  
 <211> 552  
 <212> DNA  
 <213> Human hepatitis B virus

<400> 140  
 atggacattg acccgtataa agaatttga gcttctgtgg agttactctc ttttttgcct 60  
 tctgacttct ttccttctat tcgagatctc ctcgacaccg cctcagctct atatcgggag 120  
 gccttagagt ctccggaaca ttgttctcct catcatagag cactcaggca agctattctg 180  
 tgttgggggtg agttgatgaa tctggccacc tgggtgggaa gtaatttga agaccagca 240  
 tccagggaa tagtagtcag ctatgtcaat gtaatatgg gcctaaaaat cagacaacta 300  
 ctgtgggttc acatttctg tcttactttt ggaagagaaa ctgttcttga gtatttggtg 360  
 tcttttggag tgtggattcg cactcctcct gcttacagac caccaaatgc ccctatctta 420  
 tcaacacttc cggaaactac tgttggtaga cgacgaggca ggtcccctag aagaagaact 480  
 ccctcgcctc gcagacgaag gtctcaatcg ccgcgtcgca gaagatctca atctcgggaa 540  
 tctcaatggt ag 552

<210> 141  
 <211> 552  
 <212> DNA  
 <213> Human hepatitis B virus

<400> 141  
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 gccttagagt ctcttgagca ttgttcacct caccatactg cactcaggca agcaattctt 180  
 tgctggggag acttaatgac tctagctacc tgggtgggta ctaatttga agatccagca 240

tctagggacc tagtagtcag ttatgtcaac actaatgtgg gcctaaagtt cagacaatta 300  
 ttgtgggttc acattttcttg tctcactttt ggaagagaaa cggttctaga gtatttgggtg 360  
 tcttttggag tgtggattcg cactcctcca gcttatagac caccaaagtc ccctatccta 420  
 tcaacgcttc cggagactac tgttggttaga cgacgaggca ggtcccctag aagaagaact 480  
 ccctcgcttc gcagacgaag atctcaatcg ccgcgtcgca gaagatctca atctcgggaa 540  
 tctcaatggt ag 552

<210> 142  
 <211> 552  
 <212> DNA  
 <213> Human hepatitis B virus

<400> 142  
 atggacattg acccgataaa agaatttggg gcttctgtgg agttactctc ttttttgcct 60  
 tctgacttct ttccttctat tcgagatctc ctgcacaccg cctctgctct gtatcgggag 120  
 gccttagagt ctccggaaca ttgttcacct caccatacag cactcaggca agctattctg 180  
 tgttgggggtg agttgatgaa tttggccacc tgggtgggaa gtaatttggg agaccagca 240  
 tccagggaaat tagtagtcag ctatgtcaat gttaatatgg gcctaaaaat cagacaacta 300  
 ttgtgggttc atatttcttg tcttactttt ggaagagaaa ctgttcttga gtatttgggtg 360  
 tcttttggag tgtggattcg cactcctccc gcttacagac caccaaagtc ccctatctta 420  
 tcaacacttc cggaaactac tgttggttaga cgacgaggca ggtcccctag aagaagaact 480  
 ccctcgcttc gcagacgaag gtctcaatcg ccgcgtcgca gaagatctca atctcgggaa 540  
 tctcaatggt ag 552

<210> 143  
 <211> 786  
 <212> DNA  
 <213> Ross' goose hepatitis virus

<400> 143  
 atggatatca acgcttcaag agcttttagct aatgtatatg atttgccaga tgatttcttt 60  
 ccaaagattg atgatttagt tagagatgct aaagatgctt tagagcctta ttggagaaat 120  
 gattcaataa agaaacatgt ttttaattgca actcactttg tggatctcat tgaggatttc 180  
 tggcaaacca ctgagggtat gcatgaaata gcagaggcac tgagagctat aattcctgcc 240  
 actactgctc cagtacctca gggatttctg gtccaacacg aagaagctga agagatacct 300  
 ttgggtgaac ttttttaggta tcaggaagaa agactaacta actttcaacc agattatcca 360  
 gttaccgcca gaattcatgc tcacctgaaa gcatatgcaa aaataaatga ggaatcttta 420  
 gatagagcta ggagattgct ttggtggcat tataactggt tattgtgggg cgagcctaac 480

gttaccaact atatttcgag attaagaact tggttatcca cacctgaaaa atacagagga 540  
 aaagatgccc caaccattga agcaatcact agaccaatcc aagtggcgca gggaggcaga 600  
 aataagactc agggagttag aaaatctcgt ggactcgaac ctaggagaag aagagttaaa 660  
 accacaattg tctatgggag aagacgttca aagtccaggg aaaggagagc ccctacaccc 720  
 cagcgtgcgg gctccctct cccgcgtact tctagggacc accacagatc tccctcgctt 780  
 agggaa 786

<210> 144  
 <211> 789  
 <212> DNA  
 <213> Heron hepatitis virus

<400> 144  
 atggatgtca atgcttcaag agcttttagca aatgtatatg atctgccaga tgattttctt 60  
 cctcagattg atgatcttgt tagagatgct aaggatgctt tagaacctta ttggaaagcc 120  
 gaaacaataa agaaacatgt tttaattgct actcactttg tggatttgat tgaggacttc 180  
 tggcagacca ctccaggtat gagccaaatt gcagacgccc tccgagcagt aattccacct 240  
 actaccgtac cagtaccgga gggttttctc attactcata gtgaggcaga agagatcccc 300  
 ttgaacgata tcttttcaaa tcaagaggag aggatagtca atttccaacc tgactatccc 360  
 attacagcta gaattcatac ccacttacgt gtttatacta aattgaatga acaagctttg 420  
 gacaaagctc gcagattgct ttgggtggcat tacaattgcc tcctctgggg agaagccact 480  
 gttacaaatt atatttctcg cctccgtact tggctttcta ctcccgaata atatcgaggg 540  
 aaggatgccc caaccattga agcaatcact agaccaatcc aggtggctca aggaggcaga 600  
 aatcaaaacta agggaactag aaaacctcgt ggactcgaac ctagaagacg aaaggttaaa 660  
 accacagttg tctatgggag aagacgttct aagtcccgag gcaggagatc ctctccatcc 720  
 caacgtgcgg gctccctct cccacgtaat cggggaaacc agacacgata cccctcacct 780  
 agggaatag 789

<210> 145  
 <211> 786  
 <212> DNA  
 <213> Duck hepatitis virus

<400> 145  
 atggatatca atgcttctag agccttagca aatgtgtatg atctgcctga tgattttctt 60  
 ccaaaaatag atgatcttgt aaggatgct aaagacgctt tagaacctta ttggaaatct 120  
 gactcaataa agaaacatgt tttaattgca actcattttg tggatcttat tgaggatttt 180  
 tggcagacta cgcaggtat gcatgaaatc gctgaatcac taagagcagt aattccacct 240



accactgctc ctgttcctac tgggtatctc attcagcacg aagaggcaga agagatacca 300  
 ttaggtgatt tattttaaaca tcaagaagaa agaatagtca gtttccaacc tgactacca 360  
 attacagcaa gaattcatgc acacctaaaa gcatatgcaa aaattaacga ggaatcattg 420  
 gatcgggcta ggagattgct ttggtggcat tataactgtt tactgtgggg agaagctaac 480  
 gttactaatt atatttctcg cctccgtact tggttgtcaa ctccctgaaaa gtacagaggt 540  
 cgagatgccc caaccattga agcaatcact agaccaatcc aagtggctca gggaggcaga 600  
 aaaacatctt cgggaactag aaaacctcgt ggactcgaac ctagaagaag aaaagttaaa 660  
 accacatttg tctatgggag aagacgttca aagtccaggg aaaggagagc cccttcaccc 720  
 caacgtgcgg gctccctctt cccacgtagt tcgagcagcc accatagatc tccctcgcc 780  
 aggaaa 786

<210> 146  
 <211> 789  
 <212> DNA  
 <213> Duck hepatitis virus

<400> 146  
 atggatatca atgcttctag agccttagcc aatgtgtatg atctaccaga tgatttcttt 60  
 ccaaaaatag atgatcttgt tagagatgct aaagacgctt tagagcctta ttggaaatca 120  
 gattcaataa agaaacatgt tttgattgca actcactttg tggatcttat tgaagacttc 180  
 tggcagacta cacagggcat gcatgaaata gccgaatctt taagagctgt tatacctccc 240  
 actactactc ctgttccacc gggttatctt attcagcacg aagaagctga agagatacct 300  
 ttgggagatt tattttaaaca ccaagaagaa aggatagtga gtttccaacc cgactatcca 360  
 attacggcta gaattcatgc tcatttgaaa gcttatgcaa aaattaacga ggaatcactg 420  
 gatagggcta ggagattgct ttggtggcat tacaattgtt tactgtgggg agaagctcaa 480  
 gttactaact atatttctcg cttgcgtact tggttgtcaa ctccctgagaa atatagaggt 540  
 agagatgccc cgaccattga agcaatcact agaccaatcc aagtggctca gggaggccga 600  
 aaaacaacta cgggtactag aaaacctcgt ggactcgaac ctagaagaag aaaagttaaa 660  
 accacagttg tctatgggag aagacgttca aagtcccggg aaaggagagc ccctacaccc 720  
 caacgtgcgg gctccctctt cccacgtagt tcgagcagcc accatagatc tccctcgcc 780  
 aggaaataa 789

<210> 147  
 <211> 789  
 <212> DNA  
 <213> Duck hepatitis virus

<400> 147  
 atggatatca atgcttctag agccttagcc aatgtgtatg atctgccaga tgattttcttc 60  
 cctaaaattg atgatcttgt aagggatgct aaagacgcat tagaacctta ttggaaatct 120  
 gattcaataa agaaacatgt ttttaattgca actcactttg tggatcttat tgaagacttt 180  
 tggcagacta ctcaggggtat gcatgaaatt gctgaatcct taagagctgt aataccacct 240  
 acgactgctc ctgtacctac tgggtatctc attcaacacg aggaagctga agagatacct 300  
 ttaggtgatt tatttaaaca tcaggaagaa agaatagtca gtttccaacc tgactatcct 360  
 attacagcaa gaattcatgc acacctaaaa gcttatgcta aaattaatga ggaatcgttg 420  
 gatagggcta ggagattgct ttggtggcat tacaactggt tactgtgggg agaagctaac 480  
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 cgtgatgccc caaccattga agcaatcact agaccaatcc aggtggctca gggaggcaga 600  
 aaaacatctt cggaactag aaaacctcgt ggactcgaac ctagaagaag aaaagttaaa 660  
 accacagttg tctatgggag aagacgttca aagtccaggg ataggagagc cccttcaccc 720  
 caacgtgcgg gctccctct cccacgtagt tcgagcagcc accatagatc tcctcgcct 780  
 aggaaataa 789

<210> 148  
 <211> 789  
 <212> DNA  
 <213> Duck hepatitis virus

<400> 148  
 atggatatca atgcttctag agccttagcc aatgtatatg atctgccaga tgattttcttt 60  
 ccaaaaattg atgatcttgt aagggatgct aaagatgctt tagaacctta ttggaaatct 120  
 gattcaataa agaaacatgt ttttaattgca actcacttcg tggatcttat tgaagacttc 180  
 tggcagacta cacaggggtat gcatgagata gctgaatcat taagagcagt aattccacct 240  
 accactgctc ctgtacctac ggggtatctc attcaacacg aagaggctga agagatacct 300  
 ttaggtgatc ttttcaaaca tcaggaagaa aggatagtta gtttccagcc agactatccg 360  
 attactgcta gaattcatgc acatctaaaa gcttatgcta aaattaatga ggaatcatta 420  
 gatcgggcta ggagattgct ttggtggcat tacaactggt tactgtgggg agaagctaac 480  
 gttaccaact atatttctcg gctccgtact tggttgtcaa ctctgaaaa gtaccgagggc 540  
 cgtgatgccc caaccattga agcaatcact agaccaatcc aagtggctca gggaggcaga 600  
 aaaacatctt cggaactag aaaacctcgt ggactcgaac ctagaagaag aaaagttaaa 660

accacagttg tctatgggag aagacgttca aagtcccggg aaaggagagc cccttcaccc 720  
 caacgtgcgg gctcccctct cccacgtagt tcgagcagcc accatagatc tccctcgcct 780  
 aggaaataa 789

<210> 149  
 <211> 789  
 <212> DNA  
 <213> Duck hepatitis virus

<400> 149  
 atggatatca atgcttctag agccttagcc aatgtatatg atctgccaga tgatttcttt 60  
 ccaaaaattg atgatcttgt aagggatgct aaagacgctt tagaacctta ctggaaatct 120  
 gattcaataa agaaacatgt tttgattgca actcactttg tggatcttat tgaagacttc 180  
 tggcagacta ctcaggggtat gcatgaaatt gctgaatcct taagagcagt aataccacct 240  
 accactgctc ctgtacctac tggatatctc attcaacacg aggaggctga agagataccc 300  
 ttaggtgatt tattttaaaca tcaggaagaa agaatagtca gttttcaacc agactatcct 360  
 attacagcaa gaattcatgc acacctaaaa gcttatgcaa aaattaatga ggaatctttg 420  
 gatagggcta ggagattgct ttggtggcat tacaactggt tactgtgggg agaagctaac 480  
 gttactaatt acatttctcg gctccgtact tggttgtcaa ctccggaaaa gtaccgaggc 540  
 cgtgatgccc caaccattga agcaatcact agaccaatcc aagcggctca gggaggcaga 600  
 aaaacatctt cgggaactag aaaacctcgt ggactcgaac ctagaagaag aaaagttaaa 660  
 accacagttg tctatgggag aagacgttca aagtccaggg aaaggagagc cccttcaccc 720  
 caacgtgcgg gctcccctct cccacgtagt tcgagcagcc accatagatc tccctcgcct 780  
 aggaaataa 789

<210> 150  
 <211> 789  
 <212> DNA  
 <213> Duck hepatitis virus

<400> 150  
 atggatatca atgcttctag agccttagcc aatgtatatg atctgccaga tgatttcttt 60  
 ccaaaaattg atgatcttgt aagggatgct aaagacgctt tagaacctta ctggaaatct 120  
 gattcaataa agaaacatgt tttgattgca actcactttg tggatcttat tgaagacttc 180  
 tggcagacta ctcaggggtat gcatgaaatt gctgaatcct taagagcagt aataccacct 240  
 accactgctc ctgtacctac tggatatctc attcaacacg aggaggctga agagataccc 300  
 ttaggtgatt tattttaaaca tcaggaagaa agaatagtca gttttcaacc agactatcct 360  
 attacagcaa gaattcatgc acacctaaaa gcttatgcaa aaattaatga ggaatctttg 420

gatagggcta ggagattgct ttggtggcat tacaactgtt tactgtgggg agaagctaac 480  
gttactaatt acattttctcg gctccgtact tggttgtcaa ctccggaaaa gtaccgaggc 540  
cgtgatgccc caaccattga agcaatcact agaccaatcc aagcggctca gggaggcaga 600  
aaaacatctt cgggaactag aaaacctcgt ggactcgaac ctagaagaag aaaagttaaa 660  
accacagttg tctatgggag aagacgttca aagtccaggg aaaggagagc cccttcaccc 720  
caacgtgcgg gctccccctct cccacgtagt tcgagcagcc accatagatc tccctcgctt 780  
aggaaataa 789

<210> 151  
<211> 262  
<212> PRT  
<213> Sheldgoose hepatitis virus

<400> 151

Met Asp Val Asn Ala Ser Arg Ala Leu Ala Asn Val Tyr Asp Leu Pro  
1 5 10 15

Asp Asp Phe Phe Pro Lys Ile Asp Asp Leu Val Arg Asp Ala Lys Asp  
20 25 30

Ala Leu Glu Pro Tyr Trp Arg Ser Glu Ser Ile Lys Lys His Val Leu  
35 40 45

Ile Ala Thr His Phe Val Asp Leu Ile Glu Asp Phe Trp Gln Thr Thr  
50 55 60

Gln Gly Met His Glu Ile Ala Glu Ala Leu Arg Ala Val Ile Pro Pro  
65 70 75 80

Thr Thr Thr Pro Val Pro Pro Gly Tyr Leu Ile Gln His Glu Glu Ala  
85 90 95

Glu Glu Ile Pro Leu Gly Asp Leu Phe Lys His Gln Glu Glu Arg Ile  
100 105 110

Val Ser Phe Gln Pro Asp Tyr Pro Ile Thr Ala Arg Ile His Ala His  
115 120 125

Leu Lys Ala Tyr Ala Lys Ile Asn Glu Glu Ser Leu Asp Lys Ala Arg  
130 135 140

Arg Leu Leu Trp Trp His Tyr Asn Cys Leu Leu Trp Gly Glu Ala Asn  
145 150 155 160

Val Thr Asn Tyr Ile Ser Arg Leu Arg Thr Trp Leu Ser Thr Pro Glu  
165 170 175

Arg Tyr Arg Gly Arg Asp Ala Pro Thr Ile Glu Ala Ile Thr Arg Pro  
180 185 190

Ile Gln Val Ala Gln Gly Gly Arg Asn Lys Thr Gln Gly Ser Arg Lys  
195 200 205

Pro Arg Gly Leu Gln Pro Arg Arg Arg Lys Val Lys Thr Thr Val Val  
210 215 220

Tyr Gly Arg Arg Arg Ser Lys Ser Arg Asp Arg Arg Ala Pro Ser Pro  
225 230 235 240

Gln Arg Ala Gly Ser Pro Leu Pro Arg Pro Ser Thr Ser His His Arg  
245 250 255

Ser Pro Ser Pro Arg Lys  
260

<210> 152  
<211> 262  
<212> PRT  
<213> Stork hepatitis virus

<400> 152

Met Asp Val Asn Ala Ser Arg Ala Leu Ala Asn Val Tyr Asp Leu Pro  
1 5 10 15

Asp Asp Phe Phe Pro Gln Ile Asp Asp Leu Val Arg Asp Ala Lys Asp  
20 25 30

Ala Leu Glu Pro Tyr Trp Lys Ala Glu Thr Ile Lys Lys His Val Leu  
35 40 45

Ile Ala Thr His Phe Val Asp Leu Ile Glu Asp Phe Trp Gln Thr Thr  
50 55 60

Gln Gly Met Ser Gln Ile Ala Asp Ala Leu Arg Ala Val Ile Pro Pro  
65 70 75 80

Thr Thr Thr Pro Val Pro Asp Gly Tyr Leu Ile Ser His Asn Glu Ala  
85 90 95

Gln Glu Leu Pro Leu Asn Asp Leu Phe Val Asn Gln Glu Glu Arg Ile  
100 105 110

Val Asn Phe Gln Pro Asp Tyr Pro Ile Thr Ala Arg Ile His Thr His  
 115 120 125

Leu Arg Val Tyr Thr Lys Leu Asn Glu Gln Ala Leu Asp Lys Ala Arg  
 130 135 140

Arg Leu Leu Trp Trp His Tyr Asn Cys Leu Leu Trp Gly Glu Ser Asn  
 145 150 155 160

Val Thr Asn Tyr Ile Ser Arg Leu Arg Thr Trp Leu Ser Thr Pro Glu  
 165 170 175

Lys Tyr Arg Gly Lys Asp Ala Pro Thr Ile Glu Ala Ile Thr Arg Pro  
 180 185 190

Ile Gln Val Ala Gln Gly Ser Arg Asn Gln Thr Lys Gly Val Arg Lys  
 195 200 205

Pro Arg Gly Leu Glu Pro Arg Arg Arg Lys Val Lys Thr Thr Val Val  
 210 215 220

Tyr Gly Arg Arg Arg Ser Lys Ser Arg Gly Arg Arg Ser Ser Pro Ser  
 225 230 235 240

Gln Arg Ala Gly Ser Pro Ile Pro Arg Asn Arg Glu Asn Gln Ser Arg  
 245 250 255

Ser Ser Ser Pro Arg Glu  
 260

<210> 153  
 <211> 38  
 <212> PRT  
 <213> Arctic ground squirrel hepatitis virus

<400> 153

Arg Arg Arg Gly Ser Ala Arg Val Val Arg Ser Pro Arg Arg Arg Thr  
 1 5 10 15

Pro Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Arg Arg Arg Pro Gln  
 20 25 30

Ser Pro Ala Ser Asn Cys  
 35

<210> 154  
 <211> 149  
 <212> PRT  
 <213> Arctic ground squirrel hepatitis virus

<400> 154

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ser Ser Tyr Gln Leu Leu  
 1 5 10 15

Asn Phe Leu Pro Leu Asp Phe Phe Pro Glu Leu Asn Ala Leu Val Asp  
 20 25 30

Thr Ala Thr Ala Leu Tyr Glu Glu Glu Leu Thr Gly Arg Glu His Cys  
 35 40 45

Ser Pro His His Thr Ala Ile Arg Gln Ala Leu Val Cys Trp Glu Glu  
 50 55 60

Leu Thr Arg Leu Ile Ala Trp Met Ser Ala Asn Ile Asn Ser Glu Glu  
 65 70 75 80

Val Arg Arg Val Ile Val Ala His Val Asn Asp Thr Trp Gly Leu Lys  
 85 90 95

Val Arg Gln Asn Leu Trp Phe His Leu Ser Cys Leu Thr Phe Gly Gln  
 100 105 110

His Thr Val Gln Glu Phe Leu Val Ser Phe Gly Val Arg Ile Arg Thr  
 115 120 125

Pro Ala Pro Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
 130 135 140

Glu His Thr Val Ile  
 145

<210> 155  
 <211> 33  
 <212> PRT  
 <213> Woolly monkey hepatitis virus

<400> 155

Arg Arg Arg Arg Pro Ser Gly Arg Arg Thr Pro Ser Pro Arg Arg Arg  
 1 5 10 15

Arg Ser Gln Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Ala Ser Ser  
                   20                                  25                                  30

Cys

<210> 156  
 <211> 149  
 <212> PRT  
 <213> Woolly monkey hepatitis virus

<400> 156

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu  
   1                                  5                                  10                                  15

Ser Phe Leu Pro Ala Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp  
                                   20                                  25                                  30

Thr Ala Ser Ala Leu Tyr Arg Glu Ala Leu Glu Ser Ser Asp His Cys  
                   35                                  40                                  45

Ser Pro His His Thr Ala Leu Arg Gln Thr Val Leu Cys Trp Gly Glu  
   50                                  55                                  60

Leu Met Ser Leu Ala Ser Trp Val Gly Thr Asn Leu Glu Asp Pro Ala  
  65                                  70                                  75                                  80

Ala Arg Glu Leu Val Val Ser Tyr Val Asn Asp Asn Met Gly Leu Lys  
                                   85                                  90                                  95

Val Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg  
                   100                                  105                                  110

Glu Thr Val Leu Glu Tyr Leu Val Ser Phe Trp Val Trp Ile Arg Thr  
                   115                                  120                                  125

Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
  130                                  135                                  140

Glu Thr Thr Val Val  
 145

<210> 157  
 <211> 34  
 <212> PRT  
 <213> Orangutan hepatitis virus



&lt;400&gt; 157

Arg Arg Arg Gly Arg Ser Pro Arg Arg Arg Thr Pro Ser Pro Arg Arg  
 1 5 10 15

Arg Arg Ser Gln Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Ala Ser  
 20 25 30

Gln Cys

&lt;210&gt; 158

&lt;211&gt; 149

&lt;212&gt; PRT

&lt;213&gt; Orangutan hepatitis virus

&lt;400&gt; 158

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu  
 1 5 10 15

Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp  
 20 25 30

Thr Ala Ser Ala Leu Tyr Arg Glu Ala Leu Glu Ser Pro Glu His Cys  
 35 40 45

Ser Pro Asn His Thr Ala Leu Arg Gln Ala Val Leu Cys Trp Gly Glu  
 50 55 60

Leu Met Thr Leu Ala Ser Trp Val Gly Asn Asn Leu Glu Asp Pro Ala  
 65 70 75 80

Ser Arg Glu Leu Val Val Asn Tyr Val Asn Asn Asn Met Gly Leu Lys  
 85 90 95

Ile Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg  
 100 105 110

Glu Thr Val Leu Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr  
 115 120 125

Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
 130 135 140

Glu Thr Thr Val Val  
 145

<210> 159  
 <211> 34  
 <212> PRT  
 <213> Gibbon hepatitis B virus

<400> 159

Arg Arg Arg Gly Arg Ser Pro Arg Arg Arg Thr Pro Ser Pro Arg Arg  
 1 5 10 15

Arg Arg Ser Gln Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Ala Ser  
 20 25 30

Gln Cys

<210> 160  
 <211> 149  
 <212> PRT  
 <213> Gibbon hepatitis B virus

<400> 160

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu  
 1 5 10 15

Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp  
 20 25 30

Thr Ala Ser Ala Leu Tyr Arg Glu Ala Leu Glu Ser Pro Glu His Cys  
 35 40 45

Ser Pro Asn His Thr Ala Leu Arg Gln Ala Val Leu Cys Trp Gly Glu  
 50 55 60

Leu Met Thr Leu Ala Ser Trp Val Gly Asn Asn Leu Glu Asp Pro Ala  
 65 70 75 80

Ser Arg Glu Leu Val Val Ser Tyr Val Asn Asn Asn Met Gly Leu Lys  
 85 90 95

Ile Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg  
 100 105 110

Glu Thr Val Leu Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr  
 115 120 125

Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
 130 135 140

Glu Thr Thr Val Val  
 145

<210> 161  
 <211> 34  
 <212> PRT  
 <213> Chimpanzee hepatitis B virus

<400> 161

Arg Arg Arg Gly Arg Ser Pro Arg Arg Arg Thr Pro Ser Pro Arg Arg  
 1 5 10 15

Arg Arg Ser Gln Ser Pro Arg Arg Arg Arg Ser Gln Ser Pro Ala Ser  
 20 25 30

Gln Cys

<210> 162  
 <211> 149  
 <212> PRT  
 <213> Chimpanzee hepatitis B virus

<400> 162

Met Asp Ile Asp Pro Tyr Lys Glu Phe Gly Ala Thr Val Glu Leu Leu  
 1 5 10 15

Ser Phe Leu Pro Ser Asp Phe Phe Pro Ser Val Arg Asp Leu Leu Asp  
 20 25 30

Thr Ala Ser Ala Leu Tyr Arg Glu Ala Leu Glu Ser Pro Glu His Cys  
 35 40 45

Ser Pro Asn His Thr Ala Leu Arg Gln Ala Ile Leu Cys Trp Gly Glu  
 50 55 60

Leu Met Thr Leu Ala Ser Trp Val Gly Asn Asn Leu Glu Asp Pro Ala  
 65 70 75 80

Ser Arg Glu Gln Val Val Asn Tyr Val Asn Thr Asn Met Gly Leu Lys  
 85 90 95

Ile Arg Gln Leu Leu Trp Phe His Ile Ser Cys Leu Thr Phe Gly Arg  
 100 105 110

Glu Thr Val Leu Glu Tyr Leu Val Ser Phe Gly Val Trp Ile Arg Thr  
 115 120 125

Pro Pro Ala Tyr Arg Pro Pro Asn Ala Pro Ile Leu Ser Thr Leu Pro  
 130 135 140

Glu Thr Thr Val Val  
 145

<210> 163  
 <211> 67  
 <212> PRT  
 <213> Duck hepatitis virus

<400> 163

Ala Gln Gly Gly Arg Lys Thr Ser Ser Gly Thr Arg Lys Pro Arg Gly  
 1 5 10 15

Leu Glu Pro Arg Arg Arg Lys Val Lys Thr Thr Phe Val Tyr Gly Arg  
 20 25 30

Arg Arg Ser Lys Ser Arg Glu Arg Arg Ala Pro Ser Pro Gln Arg Ala  
 35 40 45

Gly Ser Pro Leu Pro Arg Ser Ser Ser Ser His His Arg Ser Pro Ser  
 50 55 60

Pro Arg Lys  
 65

<210> 164  
 <211> 195  
 <212> PRT  
 <213> Duck hepatitis virus

<400> 164

Met Asp Ile Asn Ala Ser Arg Ala Leu Ala Asn Val Tyr Asp Leu Pro  
 1 5 10 15

Asp Asp Phe Phe Pro Lys Ile Asp Asp Leu Val Arg Asp Ala Lys Asp  
 20 25 30

Ala Leu Glu Pro Tyr Trp Lys Ser Asp Ser Ile Lys Lys His Val Leu  
 35 40 45

Ile Ala Thr His Phe Val Asp Leu Ile Glu Asp Phe Trp Gln Thr Thr  
 50 55 60

Gln Gly Met His Glu Ile Ala Glu Ser Leu Arg Ala Val Ile Pro Pro  
65 70 75 80

Thr Thr Ala Pro Val Pro Thr Gly Tyr Leu Ile Gln His Glu Glu Ala  
85 90 95

Glu Glu Ile Pro Leu Gly Asp Leu Phe Lys His Gln Glu Glu Arg Ile  
100 105 110

Val Ser Phe Gln Pro Asp Tyr Pro Ile Thr Ala Arg Ile His Ala His  
115 120 125

Leu Lys Ala Tyr Ala Lys Ile Asn Glu Glu Ser Leu Asp Arg Ala Arg  
130 135 140

Arg Leu Leu Trp Trp His Tyr Asn Cys Leu Leu Trp Gly Glu Ala Asn  
145 150 155 160

Val Thr Asn Tyr Ile Ser Arg Leu Arg Thr Trp Leu Ser Thr Pro Glu  
165 170 175

Lys Tyr Arg Gly Arg Asp Ala Pro Thr Ile Glu Ala Ile Thr Arg Pro  
180 185 190

Ile Gln Val  
195

<210> 165  
<211> 67  
<212> PRT  
<213> Duck hepatitis virus

<400> 165

Ala Gln Gly Gly Arg Lys Thr Thr Thr Gly Thr Arg Lys Pro Arg Gly  
1 5 10 15

Leu Glu Pro Arg Arg Arg Lys Val Lys Thr Thr Val Val Tyr Gly Arg  
20 25 30

Arg Arg Ser Lys Ser Arg Glu Arg Arg Ala Pro Thr Pro Gln Arg Ala  
35 40 45

Gly Ser Pro Leu Pro Arg Ser Ser Ser Ser His His Arg Ser Pro Ser  
50 55 60

Pro Arg Lys  
65

<210> 166  
 <211> 195  
 <212> PRT  
 <213> Duck hepatitis virus

<400> 166

Met Asp Ile Asn Ala Ser Arg Ala Leu Ala Asn Val Tyr Asp Leu Pro  
 1 5 10 15

Asp Asp Phe Phe Pro Lys Ile Asp Asp Leu Val Arg Asp Ala Lys Asp  
 20 25 30

Ala Leu Glu Pro Tyr Trp Lys Ser Asp Ser Ile Lys Lys His Val Leu  
 35 40 45

Ile Ala Thr His Phe Val Asp Leu Ile Glu Asp Phe Trp Gln Thr Thr  
 50 55 60

Gln Gly Met His Glu Ile Ala Glu Ser Leu Arg Ala Val Ile Pro Pro  
 65 70 75 80

Thr Thr Thr Pro Val Pro Pro Gly Tyr Leu Ile Gln His Glu Glu Ala  
 85 90 95

Glu Glu Ile Pro Leu Gly Asp Leu Phe Lys His Gln Glu Glu Arg Ile  
 100 105 110

Val Ser Phe Gln Pro Asp Tyr Pro Ile Thr Ala Arg Ile His Ala His  
 115 120 125

Leu Lys Ala Tyr Ala Lys Ile Asn Glu Glu Ser Leu Asp Arg Ala Arg  
 130 135 140

Arg Leu Leu Trp Trp His Tyr Asn Cys Leu Leu Trp Gly Glu Ala Gln  
 145 150 155 160

Val Thr Asn Tyr Ile Ser Arg Leu Arg Thr Trp Leu Ser Thr Pro Glu  
 165 170 175

Lys Tyr Arg Gly Arg Asp Ala Pro Thr Ile Glu Ala Ile Thr Arg Pro  
 180 185 190

Ile Gln Val  
 195

<210> 167  
 <211> 67  
 <212> PRT  
 <213> Duck hepatitis virus

<400> 167

Ala Gln Gly Gly Arg Lys Thr Ser Ser Gly Thr Arg Lys Pro Arg Gly  
 1 5 10 15

Leu Glu Pro Arg Arg Arg Lys Val Lys Thr Thr Val Val Tyr Gly Arg  
 20 25 30

Arg Arg Ser Lys Ser Arg Asp Arg Arg Ala Pro Ser Pro Gln Arg Ala  
 35 40 45

Gly Ser Pro Leu Pro Arg Ser Ser Ser Ser His His Arg Ser Pro Ser  
 50 55 60

Pro Arg Lys  
 65

<210> 168  
 <211> 195  
 <212> PRT  
 <213> Duck hepatitis virus

<400> 168

Met Asp Ile Asn Ala Ser Arg Ala Leu Ala Asn Val Tyr Asp Leu Pro  
 1 5 10 15

Asp Asp Phe Phe Pro Lys Ile Asp Asp Leu Val Arg Asp Ala Lys Asp  
 20 25 30

Ala Leu Glu Pro Tyr Trp Lys Ser Asp Ser Ile Lys Lys His Val Leu  
 35 40 45

Ile Ala Thr His Phe Val Asp Leu Ile Glu Asp Phe Trp Gln Thr Thr  
 50 55 60

Gln Gly Met His Glu Ile Ala Glu Ser Leu Arg Ala Val Ile Pro Pro  
 65 70 75 80

Thr Thr Ala Pro Val Pro Thr Gly Tyr Leu Ile Gln His Glu Glu Ala  
 85 90 95

Glu Glu Ile Pro Leu Gly Asp Leu Phe Lys His Gln Glu Glu Arg Ile  
 100 105 110

Val Ser Phe Gln Pro Asp Tyr Pro Ile Thr Ala Arg Ile His Ala His  
 115 120 125

Leu Lys Ala Tyr Ala Lys Ile Asn Glu Glu Ser Leu Asp Arg Ala Arg  
 130 135 140

Arg Leu Leu Trp Trp His Tyr Asn Cys Leu Leu Trp Gly Glu Ala Asn  
 145 150 155 160

Val Thr Asn Tyr Ile Ser Arg Leu Arg Thr Trp Leu Ser Thr Pro Glu  
 165 170 175

Lys Tyr Arg Gly Arg Asp Ala Pro Thr Ile Glu Ala Ile Thr Arg Pro  
 180 185 190

Ile Gln Val  
 195

<210> 169  
 <211> 67  
 <212> PRT  
 <213> Duck hepatitis virus

<400> 169

Ala Gln Gly Gly Arg Lys Thr Ser Ser Gly Thr Arg Lys Pro Arg Gly  
 1 5 10 15

Leu Glu Pro Arg Arg Arg Lys Val Lys Thr Thr Val Val Tyr Gly Arg  
 20 25 30

Arg Arg Ser Lys Ser Arg Glu Arg Arg Ala Pro Ser Pro Gln Arg Ala  
 35 40 45

Gly Ser Pro Leu Pro Arg Ser Ser Ser Ser His His Arg Ser Pro Ser  
 50 55 60

Pro Arg Lys  
 65

<210> 170  
 <211> 195  
 <212> PRT  
 <213> Duck hepatitis virus



&lt;400&gt; 170

Met Asp Ile Asn Ala Ser Arg Ala Leu Ala Asn Val Tyr Asp Leu Pro  
 1 5 10 15

Asp Asp Phe Phe Pro Lys Ile Asp Asp Leu Val Arg Asp Ala Lys Asp  
 20 25 30

Ala Leu Glu Pro Tyr Trp Lys Ser Asp Ser Ile Lys Lys His Val Leu  
 35 40 45

Ile Ala Thr His Phe Val Asp Leu Ile Glu Asp Phe Trp Gln Thr Thr  
 50 55 60

Gln Gly Met His Glu Ile Ala Glu Ser Leu Arg Ala Val Ile Pro Pro  
 65 70 75 80

Thr Thr Ala Pro Val Pro Thr Gly Tyr Leu Ile Gln His Glu Glu Ala  
 85 90 95

Glu Glu Ile Pro Leu Gly Asp Leu Phe Lys His Gln Glu Glu Arg Ile  
 100 105 110

Val Ser Phe Gln Pro Asp Tyr Pro Ile Thr Ala Arg Ile His Ala His  
 115 120 125

Leu Lys Ala Tyr Ala Lys Ile Asn Glu Glu Ser Leu Asp Arg Ala Arg  
 130 135 140

Arg Leu Leu Trp Trp His Tyr Asn Cys Leu Leu Trp Gly Glu Ala Asn  
 145 150 155 160

Val Thr Asn Tyr Ile Ser Arg Leu Arg Thr Trp Leu Ser Thr Pro Glu  
 165 170 175

Lys Tyr Arg Gly Arg Asp Ala Pro Thr Ile Glu Ala Ile Thr Arg Pro  
 180 185 190

Ile Gln Val  
 195

&lt;210&gt; 171

&lt;211&gt; 67

&lt;212&gt; PRT

&lt;213&gt; Duck hepatitis virus

&lt;400&gt; 171

Ala Gln Gly Gly Arg Lys Thr Ser Ser Gly Thr Arg Lys Pro Arg Gly  
 1 5 10 15

Leu Glu Pro Arg Arg Arg Lys Val Lys Thr Thr Val Val Tyr Gly Arg  
 20 25 30

Arg Arg Ser Lys Ser Arg Glu Arg Arg Ala Pro Ser Pro Gln Arg Ala  
 35 40 45

Gly Ser Pro Leu Pro Arg Ser Ser Ser Ser His His Arg Ser Pro Ser  
 50 55 60

Pro Arg Lys  
 65

&lt;210&gt; 172

&lt;211&gt; 195

&lt;212&gt; PRT

&lt;213&gt; Duck hepatitis virus

&lt;400&gt; 172

Met Asp Ile Asn Ala Ser Arg Ala Leu Ala Asn Val Tyr Asp Leu Pro  
 1 5 10 15

Asp Asp Phe Phe Pro Lys Ile Asp Asp Leu Val Arg Asp Ala Lys Asp  
 20 25 30

Ala Leu Glu Pro Tyr Trp Lys Ser Asp Ser Ile Lys Lys His Val Leu  
 35 40 45

Ile Ala Thr His Phe Val Asp Leu Ile Glu Asp Phe Trp Gln Thr Thr  
 50 55 60

Gln Gly Met His Glu Ile Ala Glu Ser Leu Arg Ala Val Ile Pro Pro  
 65 70 75 80

Thr Thr Ala Pro Val Pro Thr Gly Tyr Leu Ile Gln His Glu Glu Ala  
 85 90 95

Glu Glu Ile Pro Leu Gly Asp Leu Phe Lys His Gln Glu Glu Arg Ile  
 100 105 110

Val Ser Phe Gln Pro Asp Tyr Pro Ile Thr Ala Arg Ile His Ala His  
 115 120 125

Leu Lys Ala Tyr Ala Lys Ile Asn Glu Glu Ser Leu Asp Arg Ala Arg  
 130 135 140

Arg Leu Leu Trp Trp His Tyr Asn Cys Leu Leu Trp Gly Glu Ala Asn  
 145 150 155 160

Val Thr Asn Tyr Ile Ser Arg Leu Arg Thr Trp Leu Ser Thr Pro Glu  
 165 170 175

Lys Tyr Arg Gly Arg Asp Ala Pro Thr Ile Glu Ala Ile Thr Arg Pro  
 180 185 190

Ile Gln Ala  
 195

<210> 173  
 <211> 67  
 <212> PRT  
 <213> Duck hepatitis virus.

<400> 173

Ala Gln Gly Gly Arg Lys Thr Ser Ser Gly Thr Arg Lys Pro Arg Gly  
 1 5 10 15

Leu Glu Pro Arg Arg Arg Lys Val Lys Thr Thr Val Val Tyr Gly Arg  
 20 25 30

Arg Arg Ser Lys Ser Arg Glu Arg Arg Ala Pro Ser Pro Gln Arg Ala  
 35 40 45

Gly Ser Pro Leu Pro Arg Ser Ser Ser Ser His His Arg Ser Pro Ser  
 50 55 60

Pro Arg Lys  
 65

<210> 174  
 <211> 195  
 <212> PRT  
 <213> Duck hepatitis virus

<400> 174

Met Asp Ile Asn Ala Ser Arg Ala Leu Ala Asn Val Tyr Asp Leu Pro  
 1 5 10 15

Asp Asp Phe Phe Pro Lys Ile Asp Asp Leu Val Arg Asp Ala Lys Asp  
 20 25 30

Ala Leu Glu Pro Tyr Trp Lys Ser Asp Ser Ile Lys Lys His Val Leu  
 35 40 45

Ile Ala Thr His Phe Val Asp Leu Ile Glu Asp Phe Trp Gln Thr Thr  
 50 55 60

Gln Gly Met His Glu Ile Ala Glu Ser Leu Arg Ala Val Ile Pro Pro  
 65 70 75 80

Thr Thr Ala Pro Val Pro Thr Gly Tyr Leu Ile Gln His Glu Glu Ala  
 85 90 95

Glu Glu Ile Pro Leu Gly Asp Leu Phe Lys His Gln Glu Glu Arg Ile  
 100 105 110

Val Ser Phe Gln Pro Asp Tyr Pro Ile Thr Ala Arg Ile His Ala His  
 115 120 125

Leu Lys Ala Tyr Ala Lys Ile Asn Glu Glu Ser Leu Asp Arg Ala Arg  
 130 135 140

Arg Leu Leu Trp Trp His Tyr Asn Cys Leu Leu Trp Gly Glu Ala Asn  
 145 150 155 160

Val Thr Asn Tyr Ile Ser Arg Leu Arg Thr Trp Leu Ser Thr Pro Glu  
 165 170 175

Lys Tyr Arg Gly Arg Asp Ala Pro Thr Ile Glu Ala Ile Thr Arg Pro  
 180 185 190

Ile Gln Ala  
 195

<210> 175  
 <211> 67  
 <212> PRT  
 <213> Ross' goose hepatitis virus

<400> 175

Ala Gln Gly Gly Arg Asn Lys Thr Gln Gly Val Arg Lys Ser Arg Gly  
 1 5 10 15

Leu Glu Pro Arg Arg Arg Arg Val Lys Thr Thr Ile Val Tyr Gly Arg  
 20 25 30

Arg Arg Ser Lys Ser Arg Glu Arg Arg Ala Pro Thr Pro Gln Arg Ala  
 35 40 45

Gly Ser Pro Leu Pro Arg Thr Ser Arg Asp His His Arg Ser Pro Ser  
 50 55 60

Pro Arg Glu  
 65

<210> 176  
 <211> 195  
 <212> PRT  
 <213> Ross' goose hepatitis virus  
 <400> 176

Met Asp Ile Asn Ala Ser Arg Ala Leu Ala Asn Val Tyr Asp Leu Pro  
 1 5 10 15

Asp Asp Phe Phe Pro Lys Ile Asp Asp Leu Val Arg Asp Ala Lys Asp  
 20 25 30

Ala Leu Glu Pro Tyr Trp Arg Asn Asp Ser Ile Lys Lys His Val Leu  
 35 40 45

Ile Ala Thr His Phe Val Asp Leu Ile Glu Asp Phe Trp Gln Thr Thr  
 50 55 60

Gln Gly Met His Glu Ile Ala Glu Ala Leu Arg Ala Ile Ile Pro Ala  
 65 70 75 80

Thr Thr Ala Pro Val Pro Gln Gly Phe Leu Val Gln His Glu Glu Ala  
 85 90 95

Glu Glu Ile Pro Leu Gly Glu Leu Phe Arg Tyr Gln Glu Glu Arg Leu  
 100 105 110

Thr Asn Phe Gln Pro Asp Tyr Pro Val Thr Ala Arg Ile His Ala His  
 115 120 125

Leu Lys Ala Tyr Ala Lys Ile Asn Glu Glu Ser Leu Asp Arg Ala Arg  
 130 135 140

Arg Leu Leu Trp Trp His Tyr Asn Cys Leu Leu Trp Gly Glu Pro Asn  
 145 150 155 160

Val Thr Asn Tyr Ile Ser Arg Leu Arg Thr Trp Leu Ser Thr Pro Glu  
 165 170 175

Lys Tyr Arg Gly Lys Asp Ala Pro Thr Ile Glu Ala Ile Thr Arg Pro  
 180 185 190

Ile Gln Val  
 195

<210> 177  
 <211> 67  
 <212> PRT  
 <213> Sheldgoose hepatitis virus

<400> 177

Ala Gln Gly Gly Arg Asn Lys Thr Gln Gly Ser Arg Lys Pro Arg Gly  
 1 5 10 15

Leu Gln Pro Arg Arg Arg Lys Val Lys Thr Thr Val Val Tyr Gly Arg  
 20 25 30

Arg Arg Ser Lys Ser Arg Asp Arg Arg Ala Pro Ser Pro Gln Arg Ala  
 35 40 45

Gly Ser Pro Leu Pro Arg Pro Ser Thr Ser His His Arg Ser Pro Ser  
 50 55 60

Pro Arg Lys  
 65

<210> 178  
 <211> 195  
 <212> PRT  
 <213> Sheldgoose hepatitis virus

<400> 178

Met Asp Val Asn Ala Ser Arg Ala Leu Ala Asn Val Tyr Asp Leu Pro  
 1 5 10 15

Asp Asp Phe Phe Pro Lys Ile Asp Asp Leu Val Arg Asp Ala Lys Asp  
 20 25 30

Ala Leu Glu Pro Tyr Trp Arg Ser Glu Ser Ile Lys Lys His Val Leu  
 35 40 45

Ile Ala Thr His Phe Val Asp Leu Ile Glu Asp Phe Trp Gln Thr Thr  
 50 55 60

Gln Gly Met His Glu Ile Ala Glu Ala Leu Arg Ala Val Ile Pro Pro  
 65 70 75 80

Thr Thr Thr Pro Val Pro Pro Gly Tyr Leu Ile Gln His Glu Glu Ala  
85 90 95

Glu Glu Ile Pro Leu Gly Asp Leu Phe Lys His Gln Glu Glu Arg Ile  
100 105 110

Val Ser Phe Gln Pro Asp Tyr Pro Ile Thr Ala Arg Ile His Ala His  
115 120 125

Leu Lys Ala Tyr Ala Lys Ile Asn Glu Glu Ser Leu Asp Lys Ala Arg  
130 135 140

Arg Leu Leu Trp Trp His Tyr Asn Cys Leu Leu Trp Gly Glu Ala Asn  
145 150 155 160

Val Thr Asn Tyr Ile Ser Arg Leu Arg Thr Trp Leu Ser Thr Pro Glu  
165 170 175

Arg Tyr Arg Gly Arg Asp Ala Pro Thr Ile Glu Ala Ile Thr Arg Pro  
180 185 190

Ile Gln Val  
195

<210> 179  
<211> 67  
<212> PRT  
<213> Heron hepatitis virus

<400> 179

Ala Gln Gly Gly Arg Asn Gln Thr Lys Gly Thr Arg Lys Pro Arg Gly  
1 5 10 15

Leu Glu Pro Arg Arg Arg Lys Val Lys Thr Thr Val Val Tyr Gly Arg  
20 25 30

Arg Arg Ser Lys Ser Arg Gly Arg Arg Ser Ser Pro Ser Gln Arg Ala  
35 40 45

Gly Ser Pro Leu Pro Arg Asn Arg Gly Asn Gln Thr Arg Ser Pro Ser  
50 55 60

Pro Arg Glu  
65

<210> 180  
 <211> 195  
 <212> PRT  
 <213> Heron hepatitis virus

<400> 180

Met Asp Val Asn Ala Ser Arg Ala Leu Ala Asn Val Tyr Asp Leu Pro  
 1 5 10 15

Asp Asp Phe Phe Pro Gln Ile Asp Asp Leu Val Arg Asp Ala Lys Asp  
 20 25 30

Ala Leu Glu Pro Tyr Trp Lys Ala Glu Thr Ile Lys Lys His Val Leu  
 35 40 45

Ile Ala Thr His Phe Val Asp Leu Ile Glu Asp Phe Trp Gln Thr Thr  
 50 55 60

Gln Gly Met Ser Gln Ile Ala Asp Ala Leu Arg Ala Val Ile Pro Pro  
 65 70 75 80

Thr Thr Val Pro Val Pro Glu Gly Phe Leu Ile Thr His Ser Glu Ala  
 85 90 95

Glu Glu Ile Pro Leu Asn Asp Leu Phe Ser Asn Gln Glu Glu Arg Ile  
 100 105 110

Val Asn Phe Gln Pro Asp Tyr Pro Ile Thr Ala Arg Ile His Thr His  
 115 120 125

Leu Arg Val Tyr Thr Lys Leu Asn Glu Gln Ala Leu Asp Lys Ala Arg  
 130 135 140

Arg Leu Leu Trp Trp His Tyr Asn Cys Leu Leu Trp Gly Glu Ala Thr  
 145 150 155 160

Val Thr Asn Tyr Ile Ser Arg Leu Arg Thr Trp Leu Ser Thr Pro Glu  
 165 170 175

Lys Tyr Arg Gly Lys Asp Ala Pro Thr Ile Glu Ala Ile Thr Arg Pro  
 180 185 190

Ile Gln Val  
 195



<210> 181  
 <211> 67  
 <212> PRT  
 <213> Stork hepatitis virus

<400> 181

Ala Gln Gly Ser Arg Asn Gln Thr Lys Gly Val Arg Lys Pro Arg Gly  
 1 5 10 15

Leu Glu Pro Arg Arg Arg Lys Val Lys Thr Thr Val Val Tyr Gly Arg  
 20 25 30

Arg Arg Ser Lys Ser Arg Gly Arg Arg Ser Ser Pro Ser Gln Arg Ala  
 35 40 45

Gly Ser Pro Ile Pro Arg Asn Arg Glu Asn Gln Ser Arg Ser Ser Ser  
 50 55 60

Pro Arg Glu  
 65

<210> 182  
 <211> 195  
 <212> PRT  
 <213> Stork hepatitis virus

<400> 182

Met Asp Val Asn Ala Ser Arg Ala Leu Ala Asn Val Tyr Asp Leu Pro  
 1 5 10 15

Asp Asp Phe Phe Pro Gln Ile Asp Asp Leu Val Arg Asp Ala Lys Asp  
 20 25 30

Ala Leu Glu Pro Tyr Trp Lys Ala Glu Thr Ile Lys Lys His Val Leu  
 35 40 45

Ile Ala Thr His Phe Val Asp Leu Ile Glu Asp Phe Trp Gln Thr Thr  
 50 55 60

Gln Gly Met Ser Gln Ile Ala Asp Ala Leu Arg Ala Val Ile Pro Pro  
 65 70 75 80

Thr Thr Thr Pro Val Pro Asp Gly Tyr Leu Ile Ser His Asn Glu Ala  
 85 90 95

Gln Glu Leu Pro Leu Asn Asp Leu Phe Val Asn Gln Glu Glu Arg Ile  
 100 105 110

Val Asn Phe Gln Pro Asp Tyr Pro Ile Thr Ala Arg Ile His Thr His  
 115 120 125

Leu Arg Val Tyr Thr Lys Leu Asn Glu Gln Ala Leu Asp Lys Ala Arg  
 130 135 140

Arg Leu Leu Trp Trp His Tyr Asn Cys Leu Leu Trp Gly Glu Ser Asn  
 145 150 155 160

Val Thr Asn Tyr Ile Ser Arg Leu Arg Thr Trp Leu Ser Thr Pro Glu  
 165 170 175

Lys Tyr Arg Gly Lys Asp Ala Pro Thr Ile Glu Ala Ile Thr Arg Pro  
 180 185 190

Ile Gln Val  
 195

<210> 183  
 <211> 22  
 <212> PRT  
 <213> Arctic ground squirrel hepatitis virus

<400> 183

Ala Ala Gly Ser Ala Arg Val Val Arg Ser Pro Ser Gln Ser Pro Gln  
 1 5 10 15

Ser Pro Ala Ser Asn Cys  
 20

<210> 184  
 <211> 21  
 <212> PRT  
 <213> Arctic ground squirrel hepatitis virus

<400> 184

Ala Ala Gly Ser Ala Arg Val Val Arg Ser Ser Gln Ser Pro Gln Ser  
 1 5 10 15

Pro Ala Ser Asn Cys  
 20

<210> 185  
 <211> 20  
 <212> PRT  
 <213> Arctic ground squirrel hepatitis virus

<400> 185

Ala Ala Gly Ser Ala Arg Val Val Arg Ser Ser Gln Ser Gln Ser Pro  
 1 5 10 15

Ala Ser Asn Cys  
 20

<210> 186  
 <211> 19  
 <212> PRT  
 <213> Arctic ground squirrel hepatitis virus

<400> 186

Ala Ala Gly Ser Ala Arg Val Val Arg Ser Ser Gln Ser Gln Ser Ala  
 1 5 10 15

Ser Asn Cys

<210> 187  
 <211> 14  
 <212> PRT  
 <213> Arctic ground squirrel hepatitis virus

<400> 187

Arg Arg Gly Ser Ala Arg Val Val Ser Gln Ala Ser Asn Cys  
 1 5 10

<210> 188  
 <211> 14  
 <212> PRT  
 <213> Arctic ground squirrel hepatitis virus

<400> 188

Ala Arg Gly Ser Ala Arg Val Val Ser Gln Ala Ser Asn Cys  
 1 5 10

<210> 189  
 <211> 14  
 <212> PRT  
 <213> Arctic ground squirrel hepatitis virus

<400> 189

Arg Ala Gly Ser Ala Arg Val Val Ser Gln Ala Ser Asn Cys  
 1 5 10

<210> 190  
 <211> 14  
 <212> PRT  
 <213> Arctic ground squirrel hepatitis virus

<400> 190

Ala Ala Gly Ser Ala Arg Val Val Ser Gln Ala Ser Asn Cys  
 1 5 10

<210> 191  
 <211> 17  
 <212> PRT  
 <213> Arctic ground squirrel hepatitis virus

<400> 191

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Gln Ser Arg Glu Ser Gln  
 1 5 10 15

Cys

<210> 192  
 <211> 17  
 <212> PRT  
 <213> Arctic ground squirrel hepatitis virus

<400> 192

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Gln Ser Pro Ala Ser Asn  
 1 5 10 15

Cys

<210> 193  
 <211> 16  
 <212> PRT  
 <213> Arctic ground squirrel hepatitis virus

<400> 193

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Gln Ser Ala Ser Asn Cys  
 1 5 10 15

<210> 194  
 <211> 14  
 <212> PRT  
 <213> Arctic ground squirrel hepatitis virus

<400> 194

Ala Ala Gly Arg Ser Gln Ser Pro Gln Ser Ala Ser Asn Cys  
 1 5 10

<210> 195  
 <211> 15  
 <212> PRT  
 <213> Arctic ground squirrel hepatitis virus

<400> 195

Ala Ala Gly Arg Ser Pro Ser Gln Ser Gln Ser Ala Ser Asn Cys  
 1 5 10 15

<210> 196  
 <211> 13  
 <212> PRT  
 <213> Arctic ground squirrel hepatitis virus

<400> 196

Ala Ala Gly Arg Ser Gln Ser Gln Ser Ala Ser Asn Cys  
 1 5 10

<210> 197  
 <211> 18  
 <212> PRT  
 <213> Woolly monkey hepatitis virus

<400> 197

Ala Ala Arg Pro Ser Pro Ser Gln Ser Pro Ser Gln Ser Pro Ala Ser  
 1 5 10 15

Ser Cys

<210> 198  
 <211> 16  
 <212> PRT  
 <213> Woolly monkey hepatitis virus

<400> 198

Ala Ala Arg Pro Ser Gln Ser Pro Ser Gln Ser Pro Ala Ser Ser Cys  
 1 5 10 15

<210> 199  
 <211> 15  
 <212> PRT  
 <213> Woolly monkey hepatitis virus

<400> 199

Ala Ala Arg Pro Ser Gln Ser Ser Gln Ser Pro Ala Ser Ser Cys  
 1 5 10 15

<210> 200  
<211> 14  
<212> PRT  
<213> Woolly monkey hepatitis virus

<400> 200

Ala Ala Arg Pro Ser Gln Ser Ser Gln Ser Ala Ser Ser Cys  
1 5 10

<210> 201  
<211> 13  
<212> PRT  
<213> Woolly monkey hepatitis virus

<400> 201

Arg Arg Gly Ser Gln Ser Arg Arg Ser Gln Ser Ser Cys  
1 5 10

<210> 202  
<211> 13  
<212> PRT  
<213> Woolly monkey hepatitis virus

<400> 202

Ala Arg Gly Ser Gln Ser Arg Arg Ser Gln Ser Ser Cys  
1 5 10

<210> 203  
<211> 13  
<212> PRT  
<213> Woolly monkey hepatitis virus

<400> 203

Arg Ala Gly Ser Gln Ser Arg Arg Ser Gln Ser Ser Cys  
1 5 10

<210> 204  
<211> 13  
<212> PRT  
<213> Woolly monkey hepatitis virus

<400> 204

Ala Ala Gly Ser Gln Ser Arg Arg Ser Gln Ser Ser Cys  
1 5 10

<210> 205  
 <211> 18  
 <212> PRT  
 <213> Woolly monkey hepatitis virus

<400> 205

Ala Ala Arg Arg Arg Pro Ser Gln Ser Pro Ser Gln Ser Pro Ala Ser  
 1 5 10 15

Ser Cys

<210> 206  
 <211> 17  
 <212> PRT  
 <213> Woolly monkey hepatitis virus

<400> 206

Ala Ala Arg Arg Arg Pro Ser Gln Ser Pro Ser Gln Ser Ala Ser Ser  
 1 5 10 15

Cys

<210> 207  
 <211> 16  
 <212> PRT  
 <213> Woolly monkey hepatitis virus

<400> 207

Ala Ala Arg Arg Arg Pro Ser Gln Ser Pro Ser Gln Ser Ser Ser Cys  
 1 5 10 15

<210> 208  
 <211> 14  
 <212> PRT  
 <213> Woolly monkey hepatitis virus

<400> 208

Ala Ala Arg Arg Ser Gln Ser Pro Ser Gln Ser Ser Ser Cys  
 1 5 10

<210> 209  
 <211> 15  
 <212> PRT  
 <213> Woolly monkey hepatitis virus

<400> 209

Ala Ala Arg Arg Ser Pro Ser Gln Ser Ser Gln Ser Ser Ser Cys  
 1 5 10 15

<210> 210  
 <211> 13  
 <212> PRT  
 <213> Woolly monkey hepatitis virus

<400> 210

Ala Ala Arg Arg Ser Gln Ser Ser Gln Ser Ser Ser Cys  
 1 5 10

<210> 211  
 <211> 18  
 <212> PRT  
 <213> Orangutan hepatitis virus

<400> 211

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Pro Ala Ser  
 1 5 10 15

Gln Cys

<210> 212  
 <211> 16  
 <212> PRT  
 <213> Orangutan hepatitis virus

<400> 212

Ala Ala Gly Arg Ser Gln Ser Pro Ser Gln Ser Pro Ala Ser Gln Cys  
 1 5 10 15

<210> 213  
 <211> 15  
 <212> PRT  
 <213> Orangutan hepatitis virus

<400> 213

Ala Ala Gly Arg Ser Gln Ser Ser Gln Ser Pro Ala Ser Gln Cys  
 1 5 10 15

<210> 214  
 <211> 14  
 <212> PRT  
 <213> Orangutan hepatitis virus

<400> 214

Ala Ala Gly Arg Ser Gln Ser Ser Gln Ser Ala Ser Gln Cys  
 1 5 10



<210> 215  
 <211> 11  
 <212> PRT  
 <213> Orangutan hepatitis virus

<400> 215

Arg Arg Gly Ser Gln Ser Pro Ala Ser Gln Cys  
 1 5 10

<210> 216  
 <211> 11  
 <212> PRT  
 <213> Orangutan hepatitis virus

<400> 216

Ala Arg Gly Ser Gln Ser Pro Ala Ser Gln Cys  
 1 5 10

<210> 217  
 <211> 11  
 <212> PRT  
 <213> Orangutan hepatitis virus

<400> 217

Arg Ala Gly Ser Gln Ser Pro Ala Ser Gln Cys  
 1 5 10

<210> 218  
 <211> 11  
 <212> PRT  
 <213> Orangutan hepatitis virus

<400> 218

Ala Ala Gly Ser Gln Ser Pro Ala Ser Gln Cys  
 1 5 10

<210> 219  
 <211> 18  
 <212> PRT  
 <213> Orangutan hepatitis virus

<400> 219

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Pro Ala Ser  
 1 5 10 15

Gln Cys

<210> 220  
<211> 17  
<212> PRT  
<213> Orangutan hepatitis virus

<400> 220

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Ala Ser Gln  
1 5 10 15

Cys

<210> 221  
<211> 16  
<212> PRT  
<213> Orangutan hepatitis virus

<400> 221

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Gln Ser Ser Gln Cys  
1 5 10 15

<210> 222  
<211> 15  
<212> PRT  
<213> Orangutan hepatitis virus

<400> 222

Ala Ala Gly Arg Ser Gln Ser Pro Ser Gln Ser Ala Ser Gln Cys  
1 5 10 15

<210> 223  
<211> 16  
<212> PRT  
<213> Orangutan hepatitis virus

<400> 223

Ala Ala Gly Arg Ser Pro Ser Gln Ser Ser Gln Ser Ala Ser Gln Cys  
1 5 10 15

<210> 224  
<211> 14  
<212> PRT  
<213> Orangutan hepatitis virus

<400> 224

Ala Ala Gly Arg Ser Gln Ser Ser Gln Ser Ala Ser Gln Cys  
1 5 10

<210> 225  
 <211> 23  
 <212> PRT  
 <213> Duck hepatitis virus

<400> 225

Ala Ala Gly Gly Glu Arg Gly Val Arg Ser Pro Ser Gln Ser Pro Ser  
 1 5 10 15

Arg Ser Pro Ser Pro Arg Lys  
 20

<210> 226  
 <211> 21  
 <212> PRT  
 <213> Duck hepatitis virus

<400> 226

Ala Ala Gly Gly Glu Arg Gly Val Arg Ser Gln Ser Pro Ser Arg Ser  
 1 5 10 15

Pro Ser Pro Arg Lys  
 20

<210> 227  
 <211> 20  
 <212> PRT  
 <213> Duck hepatitis virus

<400> 227

Ala Ala Gly Gly Glu Arg Gly Val Arg Ser Gln Ser Ser Arg Ser Pro  
 1 5 10 15

Ser Pro Arg Lys  
 20

<210> 228  
 <211> 19  
 <212> PRT  
 <213> Duck hepatitis virus

<400> 228

Ala Ala Gly Gly Glu Arg Gly Val Arg Ser Gln Ser Ser Arg Ser Ser  
 1 5 10 15

Pro Arg Lys

<210> 229  
 <211> 15  
 <212> PRT  
 <213> Duck hepatitis virus

<400> 229

Arg Arg Gly Gly Ala Arg Ala Ser Arg Ser Pro Ser Pro Arg Lys  
 1 5 10 15

<210> 230  
 <211> 15  
 <212> PRT  
 <213> Duck hepatitis virus

<400> 230

Ala Arg Gly Gly Ala Arg Ala Ser Arg Ser Pro Ser Pro Arg Lys  
 1 5 10 15

<210> 231  
 <211> 15  
 <212> PRT  
 <213> Duck hepatitis virus

<400> 231

Arg Ala Gly Gly Ala Arg Ala Ser Arg Ser Pro Ser Pro Arg Lys  
 1 5 10 15

<210> 232  
 <211> 15  
 <212> PRT  
 <213> Duck hepatitis virus

<400> 232

Ala Ala Gly Gly Ala Arg Ala Ser Arg Ser Pro Ser Pro Arg Lys  
 1 5 10 15

<210> 233  
 <211> 19  
 <212> PRT  
 <213> Duck hepatitis virus

<400> 233

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Ser Arg Ser Pro Ser  
 1 5 10 15

Pro Arg Lys

<210> 234  
 <211> 19  
 <212> PRT  
 <213> Duck hepatitis virus

<400> 234

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Ser Arg Ser Pro Ser  
 1 5 10 15

Pro Arg Glu

<210> 235  
 <211> 18  
 <212> PRT  
 <213> Duck hepatitis virus

<400> 235

Ala Ala Gly Arg Ser Pro Ser Gln Ser Pro Ser Ser Arg Ser Ser Pro  
 1 5 10 15

Arg Glu

<210> 236  
 <211> 16  
 <212> PRT  
 <213> Duck hepatitis virus

<400> 236

Ala Ala Gly Arg Ser Gln Ser Pro Ser Ser Arg Ser Ser Pro Arg Glu  
 1 5 10 15

<210> 237  
 <211> 16  
 <212> PRT  
 <213> Duck hepatitis virus

<400> 237

Ala Ala Gly Arg Ser Pro Ser Gln Ser Ser Arg Ser Ser Pro Arg Glu  
 1 5 10 15

<210> 238  
 <211> 14  
 <212> PRT  
 <213> Duck hepatitis virus

<400> 238

Ala Ala Gly Arg Ser Gln Ser Ser Arg Ser Ser Pro Arg Glu  
 1 5 10

<210> 239  
 <211> 20  
 <212> PRT  
 <213> Tetanus toxin

<400> 239

Ile Asp Lys Ile Ser Asp Val Ser Thr Ile Val Pro Tyr Ile Gly Pro  
 1 5 10 15

Ala Leu Asn Ile  
 20

<210> 240  
 <211> 21  
 <212> PRT  
 <213> Tetanus toxin

<400> 240

Asn Asn Phe Thr Val Ser Phe Trp Leu Arg Val Pro Lys Val Ser Ala  
 1 5 10 15

Ser His Leu Glu Gln  
 20

<210> 241  
 <211> 21  
 <212> PRT  
 <213> Tetanus toxin

<400> 241

Phe Asn Asn Phe Thr Val Ser Phe Trp Leu Arg Val Pro Lys Val Ser  
 1 5 10 15

Ala Ser His Leu Glu  
 20

<210> 242  
 <211> 14  
 <212> PRT  
 <213> Tetanus toxin

<400> 242

Gln Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu  
 1 5 10

<210> 243  
 <211> 16  
 <212> PRT  
 <213> Tetanus toxin

<400> 243

Val Ser Ile Asp Lys Phe Arg Ile Phe Cys Lys Ala Leu Asn Pro Lys  
 1 5 10 15

<210> 244  
 <211> 16  
 <212> PRT  
 <213> Tetanus toxin

<400> 244

Leu Lys Phe Ile Ile Lys Arg Tyr Thr Pro Asn Asn Glu Ile Asp Ser  
 1 5 10 15

<210> 245  
 <211> 19  
 <212> PRT  
 <213> Diphtheria toxin

<400> 245

Pro Leu Phe Ala Gly Ala Asn Tyr Ala Ala Trp Ala Val Asn Val Ala  
 1 5 10 15

Gln Val Ile

<210> 246  
 <211> 20  
 <212> PRT  
 <213> Diphtheria toxin

<400> 246

Val His His Asn Thr Glu Glu Ile Val Ala Gln Ser Ile Ala Leu Ser  
 1 5 10 15

Ser Leu Met Val  
 20

<210> 247  
 <211> 20  
 <212> PRT  
 <213> Diphtheria toxin

&lt;400&gt; 247

Gln Ser Ile Ala Leu Ser Ser Leu Met Val Ala Gln Ala Ile Pro Leu  
1 5 10 15

Val Gly Glu Leu  
20

&lt;210&gt; 248

&lt;211&gt; 20

&lt;212&gt; PRT

&lt;213&gt; Diptheria toxin

&lt;400&gt; 248

Gln Gly Glu Ser Gly His Asp Ile Lys Ile Thr Ala Glu Asn Thr Pro  
1 5 10 15

Leu Pro Ile Ala  
20

&lt;210&gt; 249

&lt;211&gt; 20

&lt;212&gt; PRT

&lt;213&gt; Diptheria toxin

&lt;400&gt; 249

Val Asp Ile Gly Phe Ala Ala Tyr Asn Phe Val Glu Ser Ile Ile Asn  
1 5 10 15

Leu Phe Gln Val  
20

&lt;210&gt; 250

&lt;211&gt; 20

&lt;212&gt; PRT

&lt;213&gt; Diptheria toxin

&lt;400&gt; 250

Gly Val Leu Leu Pro Thr Ile Pro Gly Lys Leu Asp Val Asn Lys Ser  
1 5 10 15

Lys Thr His Ile  
20



<210> 251  
 <211> 20  
 <212> PRT  
 <213> Plasmodium falciparum

<400> 251

Glu Tyr Leu Asn Lys Ile Gln Asn Ser Leu Ser Thr Glu Trp Ser Pro  
 1 5 10 15

Cys Ser Val Thr  
 20

<210> 252  
 <211> 20  
 <212> PRT  
 <213> Plasmodium falciparum

<400> 252

Asp Ile Glu Lys Lys Ile Cys Lys Met Glu Lys Cys Ser Ser Val Phe  
 1 5 10 15

Asn Val Val Asn  
 20

<210> 253  
 <211> 15  
 <212> PRT  
 <213> Hepatitis B virus

<400> 253

Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu Asp  
 1 5 10 15

<210> 254  
 <211> 13  
 <212> PRT  
 <213> Influenza virus

<400> 254

Pro Lys Tyr Val Lys Gln Asn Thr Leu Lys Leu Ala Thr  
 1 5 10

<210> 255  
 <211> 16  
 <212> PRT  
 <213> Influenza virus

<400> 255

Tyr Ser Gly Pro Leu Lys Ala Glu Ile Ala Gln Arg Leu Glu Asp Val  
 1 5 10 15

<210> 256  
<211> 18  
<212> PRT  
<213> Measles virus

<400> 256

Lys	Leu	Leu	Ser	Leu	Ile	Lys	Gly	Val	Ile	Val	His	Arg	Leu	Glu	Gly
1				5					10					15	

Val Glu